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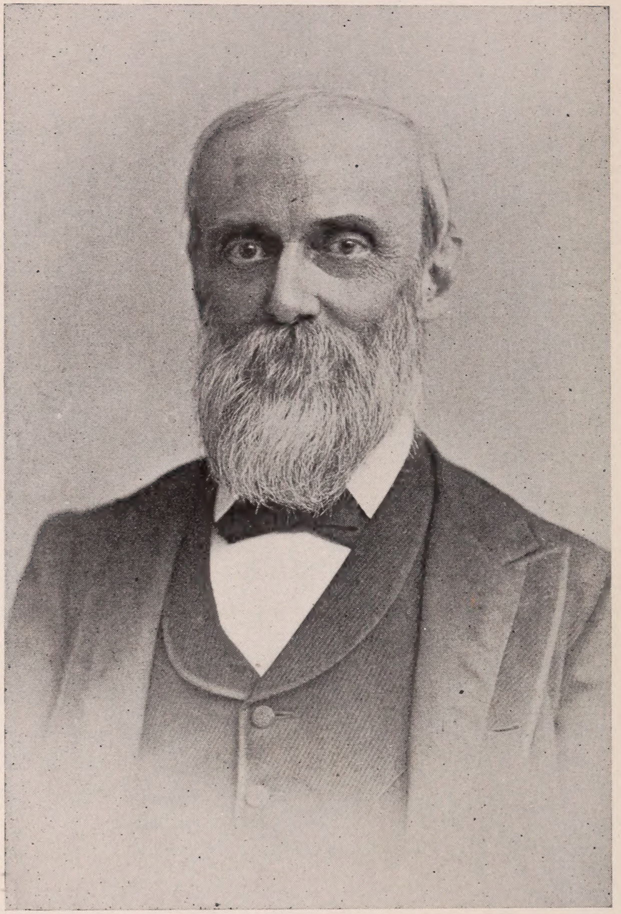

ALFRED B. TAYLOR.

Died at Philadelphia, Pa., February 28, 1898, Aged 74 years.
Joined the Association in 1852 and was elected President in 1890.

(For Obituary Notice, see page 51 of the present volume.)

MAURICE W. ALEXANDER.

Died at St. Louis, Mo., June 6, 1898, Aged 65 years.
Joined the Association in 1871 and was elected President in 1888.

(For Obituary Notice, see page 45 of the present volume.)

PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

FORTY-SIXTH ANNUAL MEETING,

HELD AT

BALTIMORE, MD., AUGUST, 1898.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

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1898.

INITIAL MEETING AT NEW YORK 1851.
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PHARMACEUTICAL
ASSOCIATION
INCORPORATED AT
WASHINGTON, D.C.
FEB'Y 21.
1888.
ORGANIZED AT PHILADELPHIA-1852.

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1898-99.

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LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852..	Philadelphia, Pa....	*Daniel B. Smith,* Philadelphia.	*George W. Andrews,* Baltimore.	*Samuel M. Colcord,* Boston.	*C. Augustus Smith,* Cincinnati.
Aug. 24, 1853..	Boston, Mass.......	*William A. Brewer,* Boston.	*George D. Coggeshall,* New York.	*Alexander Duval,* Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854..	Cincinnati, O.	*William B. Chapman,* Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim,* New York.	*Joseph Laidley,* Richmond, Va.
Sept. 11, 1855..	New York, N. Y. ...	*John Meakim,* New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis,* Philadelphia.	*Henry F. Fish,* Waterbury, Conn.
Sept. 9, 1856..	Baltimore, Md.	*George W. Andrews,* Baltimore.	*John L. Kidwell,* Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted,* New York, N. Y.
Sept. 8, 1857..	Philadelphia, Pa. ...	*Charles Ellis,* Philadelphia.	*James Cooke,* Fredericksburg, Va.	*Samuel P. Peck,* Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858..	Washington, D. C...	*John L. Kidwell,* Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher,* St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859..	Boston, Mass.	*Samuel M. Colcord,* Boston.	*William Procter, Jr.,* Philadelphia.	*Joseph Roberts,* Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860..	New York, N. Y. ...	*Henry T. Kiersted,* New York.	William J. M. Gordon, Cincinnati.	*William S. Thompson,* Baltimore.	*Theodore Metcalf,* Boston.
Aug. 27, 1862..	Philadelphia, Pa. ...	*William Procter, Jr.,* Philadelphia.	*John Milhau,* New York.	*Eugene L. Massot,* St. Louis.	*J. Faris Moore,* Baltimore.
Sept. 8, 1863..	Baltimore, Md.	*J. Faris Moore,* Baltimore.	*John M. Maisch,* Philadelphia.	Chas. A. Tufts, Dover, N. H.	*George W. Weyman,* Pittsburgh.
Sept. 21, 1864..	Cincinnati, O.	William J. M Gordon, Cincinnati.	*Richard H. Stabler,* Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis,* Boston.

LIST OF OFFICERS (Continued).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 5, 1865..	Boston, Mass.	*Henry W. Lincoln*, Boston.	*George C. Close*, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	Charles A. Heinitsh, Lancaster, Pa.
Aug. 22, 1866..	Detroit, Mich.......	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867..	New York, N. Y.....	*John Milhau*, New York.	*Robert J. Brown*, Leavenworth, Kan.	*N. Hynson Jennings*, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868..	Philadelphia, Pa....	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869..	Chicago, Ill........	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	*John H. Pope*, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870..	Baltimore, Md......	*Richard H. Stabler*. Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871..	St. Louis, Mo	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	*George F. H. Markoe*, Boston.	*Matthew F. Ash*, Jackson, Miss.
Sept. 3, 1872..	Cleveland, O.	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	*Henry C. Gaylord*, Cleveland, O.
Sept. 16, 1873..	Richmond, Va......	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	*Paul Balluff*, New York.
Sept. 8, 1874..	Louisville, Ky......	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875..	Boston, Mass.	*George F. H. Markoe*, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.
Sept. 12, 1876..	Philadelphia, Pa....	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	*Jacob D. Wells*, Cincinnati.
Sept. 4, 1877..	Toronto, Can.......	William Saunders, London, Ont.	Ewen McIntyre, New York.	*John Ingalls*, Macon, Ga.	*Emlen Painter*, San Francisco.

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Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Nov. 26, 1878	Atlanta, Ga.	*Gustavus J. Luhn*, Charleston, S. C.	*Frederick T. Whiting*, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879	Indianapolis, Ind.	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880	Saratoga, N. Y.	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington, D. C.	William Simpson, Raleigh, N. C.
Aug. 23, 1881	Kansas City, Mo.	*P. Wendover Bedford*, New York.	*Emlen Painter*, San Francisco.	George Leis, Lawrence, Kan.	*John F. Judge*, Cincinnati.
Sept. 12, 1882	Niagara Falls, N. Y.	Charles A. Heinitsh, Lancaster, Pa.	*John Ingalls*, Macon, Ga.	Louis Dohme, Baltimore.	*William B. Blanding*, Providence, R. I.
Sept. 11, 1883	Washington, D. C.	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884	Milwaukee, Wis	*John Ingalls*, Macon, Ga.	*John A. Dadd*, Milwaukee, Wis.	Henry Canning, Boston, Mass.	*Charles F. Goodman*, Omaha, Neb.
Sept. 8, 1885	Pittsburgh, Pa	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886	Providence, R. I.	Chas. A. Tufts, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	*M. W. Alexander*, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887	Cincinnati, O.	John U. Lloyd, Cincinnati, O.	*M. W. Alexander*, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888	Detroit, Mich	*M. W. Alexander*, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	*Fred. Wilcox*, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889	San Francisco, Cal.	*Emlen Painter*, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890	Old Pt. Comfort, Va.	*A. B. Taylor*, Philadelphia.	A. B. Stevens, Ann Arbor, Mich.	Chas. E. Dohme, Baltimore, Md.	Jas. M. Good, St. Louis, Mo.

LIST OF OFFICERS (Concluded).

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
April 27, 1891 . .	New Orleans, La. . . .	A. K. Finlay, New Orleans, La.	Geo. J. Seabury, New York, N. Y.	W. H. Torbert, Dubuque, Ia.	L. T. Dunning, Sioux Falls, S. Dak.
July 14, 1892 . .	Profile House, N. H.	Jos. P. Remington, Philadelphia.	A. P. Preston, Portsmouth, N. H.	Sidney P. Watson, Atlanta, Ga.	Wm. H. Averill, Frankfort, Ky.
Aug. 14, 1893 . .	Chicago, Ill.	Edgar L. Patch, Boston.	Leo Eliel, South Bend, Ind.	Wiley Rogers, Louisville, Ky.	Chas. Caspari, Jr., Baltimore, Md.
Sept. 3, 1894 . .	Asheville, N. C.	William Simpson, Raleigh, N. C.	Chas. M. Ford, Denver, Colo.	Jno. N. Hurty, Indianapolis, Ind.	Jos. E. Morrison, Montreal, Can.
Aug. 14, 1895 . .	Denver, Colo.	James M. Good, St. Louis, Mo.	Chas. E. Dohme, Baltimore, Md.	Adolph Brandenberger, Jefferson City, Mo.	Mrs. M. O. Miner, Hiawatha, Kan.
Aug. 12, 1896 . .	Montreal, Can	Joseph E. Morrison, Montreal, Can.	Geo. F. Payne, Atlanta, Ga.	Wm. A. Frost, St. Paul, Minn.	Geo. W. Parisen, Perth Amboy, N. J.
Aug. 23, 1897 . .	Lake Minnetonka, Minn	Henry M. Whitney, Lawrence, Mass.	George C. Bartells, Camp Point, Ills.	Wm. S. Thompson, Washington, D. C.	Jacob A. Miller, Harrisburg, Pa.
Aug. 29, 1898 . .	Baltimore, Md	Charles E. Dohme, Baltimore, Md.	George F. Payne, Atlanta, Ga.	James H. Beal, Scio, O.	Miss Josie A. Wancus, Minneapolis, Minn.

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–99.

RECORDING SECRETARIES.

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863–64.
Henry N. Rittenhouse, Philadelphia, 1864–65.
H. M. Whelpley, St. Louis, 1893.

CORRESPONDING SECRETARIES.

William Procter, Jr., 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edward Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–65.
John M. Maisch, Philadelphia, 1862–63.

PERMANENT SECRETARIES.

John M. Maisch, Philadelphia, 1865–Sept., 1893.
Henry M. Whelpley, St. Louis (acting), August, 1893.
Joseph P. Remington, Philadelphia, 1893–94.
Chas. Caspari, Jr., Baltimore, 1894–96.

GENERAL SECRETARY.

Chas. Caspari, Jr., Baltimore, 1896–99.

LOCAL SECRETARIES.

For the meeting held in

1867....*P. Wendover Bedford.*
1868....*Alfred B. Taylor.*
1869....*Henry W. Fuller.*
1870....*J. Faris Moore.*
1871....*William H. Crawford.*
1872....*Henry C. Gaylord.*
1873....Thomas H. Hazard.
1874....Emil Scheffer.
1875....Samuel A. D. Sheppard.
1876....Adolphus W. Miller.
1877....Henry J. Rose.

For the meeting held in

1878....*Jesse W. Rankin.*
1879....*Eli Lilly.*
1880....Charles F. Fish.
1881....William T. Ford.
1882....*Hiram E. Griffith.*
1883....Charles Becker.
1884....Henry C. Schranck.
1885....George A. Kelly.
1886....*William B. Blanding.*
1887....George W. Voss.
1888....James Vernor.

For the meeting held in

1889....Edward W. Runyon.
1890....Charles E. Dohme.
1891....A. K. Finlay.
1892....H. M. Whitney.
1893....Henry Biroth.
1894....W. G. Smith.
1895....Edm. L. Scholtz.
1896....Joseph E. Morrison.
1897....Edw. Shumpik.
1898....Henry P. Hynson.
1899....Lewis C. Hopp.

REPORTERS ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–91, and 1895–99.
Chas. Rice, New York, N. Y., 1891–92.
Henry Kraemer, New York, N. Y., 1892–95.

OFFICERS OF THE COUNCIL SINCE ITS FIRST ORGANIZATION.

	Chairman.	*Vice-Chairman.*	*Secretary.*
1880–81	Jos. P. Remington.	*Joseph Roberts.*	Geo. W. Kennedy.
1881–82	" "	Wm. J. M. Gordon.	" "
1882–83	" "	" "	" "
1883–84	" "	C. Lewis Diehl.	" "
1884–85	" "	*John A. Dadd.*	" "
1885–86	" "	C. Lewis Diehl.	" "
1886–87	Wm. S. Thompson.	*H. J. Menninger.*	" "
1887–88	Wm. H. Rogers.	Karl Simmon.	" "
1888–89	Jas. M. Good.	*Emlen Painter.*	" "
1889–90	" "	Wm. S. Thompson.	" "
1890–91	" "	" "	" "
1891–92	" "	" "	" "
1892–93	" "	H. M. Whitney.	" "
1893–94	" "	" "	" "
1894–95	Wm. S. Thompson.	" "	" "
1895–96	" "	Wm. C. Alpers.	" "
1896–97	" "	Jas. M. Good.	" "
1897–98	" "	" "	" "
1898–99	" "	" "	" "

PAST AND PRESENT OFFICERS OF THE SECTIONS.

Section on Commercial Interests.

	Chairman.	*Secretary.*
1887–88	A. H. Hollister.	*J. M. Colcord.*
1888–89	" "	" "
1889–90	Leo Eliel.	F. B. Kilmer.
1890–91	Henry Canning.	W. L. Dewoody.
1891–92	W. H. Torbert.	Arthur Bassett.
1892–93	" "	" "

Section on Commercial Interests.—*Con.*

	Chairman.	*Secretary.*
1893–94	Wiley Rogers.	Jas. O. Burge.
1894–95	Geo. J. Seabury.	" "
1895–96	" "	Clay W. Holmes.
1896–97	Lewis C. Hopp.	E. D'Avignon.
1897–98	Joseph Jacobs.	Jas. H. Bobbitt.
1898–99	" "	" "

SECTION ON SCIENTIFIC PAPERS.

	Chairman.	*Secretary.*
1887–88	T. Roberts Baker.	A. B. Lyons.
1888–89	*Emlen Painter.*	H. M. Whelpley.
1889–90	H. M. Whelpley.	C. F. Dare.
1890–91	E. L. Patch.	C. S. N. Hallberg.
1891–92	C. S. N. Hallberg.	H. W. Snow.
1892–93	C. T. P. Fennel.	F. G. Ryan.
1893–94	L. E. Sayre.	C. M. Ford.
1894–95	A. R. L. Dohme.	Geo. B. Kauffman.
1895–96	S. P. Sadtler.	W. C. Alpers.
1896–97	W. C. Alpers.	V. Coblentz.
1897–98	Edward Kremers.	A. B. Lyons.
1898–99	Henry H. Rusby.	H. V. Arny.

SECTION ON PHARMACEUTICAL EDUCATION.

	Chairman.	*Secretary.*
1887–88	*John F. Judge.*	H. M. Whelpley.
1888–89	*P. W. Bedford.*	L. E. Sayre.

SECTION ON PHARMACEUTICAL LEGISLATION.

	Chairman.	*Secretary.*
1887–88	R. F. Bryant.	W. P. De Forest.
1888–89	C. W. Day.	J. N. Hurty.

SECTION ON PHARMACEUTICAL EDUCATION AND LEGISLATION.

	Chairman.	*Secretary.*
1889–90	*P. W. Bedford.*	A. B. Stevens.
1890–91	Wm. Simon.	L. C. Hogan.
1891–92	A. B. Stevens.	" "
1892–93	R. G. Eccles.	" "
1893–94	" "	" "
1894–95	Jas. M. Good.	C. S. N. Hallberg.
1895–96	C. S. N. Hallberg.	Jas. H. Beal.
1896–97	" "	" "
1897–98	Jas. H. Beal.	H. Gordon Webster.
1898–99	A. B. Lyons.	C. B. Lowe.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	Albert E. Brown, 14 N. Water St.,	Mobile.
Arizona,	Clemens L. Eschman, Washington & Centre Sts.,	Phœnix.
Arkansas,	John B. Bond, Main and Fifth streets,	Little Rock.
	William L. Dewoody,	Pine Bluff.
California,	William T. Wenzell, 436 Oak street,	San Francisco.
	George B. Flint, 1101 Broadway,	Oakland.
Colorado,	Edmund L. Scholtz, Sixteenth & Stout streets,	Denver.
Dist. of Columbia,	Walter G. Duckett, 22d st. and Penna. ave.,	Washington.
Connecticut,	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
Delaware,	Herbert K. Watson, 803 Market St.,	Wilmington.
Florida,	William Aird, Maggie & E. Brough streets,	Jacksonville.
	Sydney B. Leonardi, Franklin St.,	Tampa.
Georgia,	John P. Turner, 1002 Broad St.,	Columbus.
	Robert H. Land, 812 Broad street,	Augusta.
	Thomas A. Cheatham, Mulberry & 3d Sts.,	Macon.
	Sidney P. Watson, 137 Richardson street,	Atlanta.
Idaho,	David E. Smithson,	Emmett, Canyon Co.
Illinois,	David G. Plummer, 6 Main street,	Bradford.
	C. S. N. Hallberg, 358 Dearborn St.,	Chicago.
	Charles Zimmermann, 423 S. Adams street,	Peoria.

Indiana,	Henry J. Schlaepfer, Second and Main streets,	Evansville.
	Frank H. Carter, 772 Massachusetts avenue,	Indianapolis.
	Jacob Baur, 701 Wabash avenue,	Terre Haute.
Indian Territory.	Chas. G. Moore,	Eufaula.
Iowa,	John W. Ballard, 106 West Second street,	Davenport.
	Theodore W. Ruete, 568 Main street,	Dubuque.
	George H. Schafer, 713 Front street,	Fort Madison.
	Silas H. Moore, 525 Fourth street,	Sioux City.
Kansas,	George Leis, 747 Massachusetts street,	Lawrence.
Kentucky,	George A. Zwick, Eleventh st. and Madison ave.,	Covington.
	William H. Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, Third street and Broadway,	Louisville.
Louisiana,	Alexander K. Finlay, 186 Camp street,	New Orleans.
Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Edward A. Hay, Free and Middle sts.,	Portland.
Maryland,	D. M. R. Culbreth, 203 E. Preston street,	Baltimore.
	Thomas W. Shryer, 111 Baltimore street,	Cumberland.
Massachusetts,	S. A. D. Sheppard, 1129 Washington street,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, Thompson Square,	Charlestown.
	Freeman H. Butler, 141 Central street,	Lowell.
	James E. Blake, 64 North Second street,	New Bedford.
	John H. Manning, 51 North street,	Pittsfield.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 178 Essex street,	Salem.
	Francis M. Harris, 814 Main street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
Minnesota,	Wm. A. Frost, cor. Selby & Western aves.,	St. Paul.
	H. Gordon Webster, 15 Washington ave., W..	Minneapolis.
Mississippi,	Joseph W. Eckford, Commerce street,	Aberdeen.
Missouri,	James M. Good, 2348 Olive street,	St. Louis.
	George Eyssell, 1036 Union ave.,	Kansas City.
Nebraska,	Autumn V. Pease,	Fairbury.
New Hampshire,	Nelson S. Whitman, 175 Main street,	Nashua.
	Andrew P. Preston, 2 Congress Block,	Portsmouth.
New Jersey,	Wm. M. Oliver, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth st. & Lafayette ave.,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 861 Broad street,	Newark.
	Howard P. Reynolds, 71 Washington ave., N.,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	Rudolf C. Werner, 2592 Atlantic ave.,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Du Bois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street,	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
	James T. King, Main and South streets,	Middletown.
	John McKesson, Jr., 91 Fulton street,	New York.
	Charles F. Fish, 348 Broadway,	Saratoga.
	Charles W. Snow, 214 Warren street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.

North Carolina,	William Simpson, 101 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
North Dakota,	Henry L. Haussamen,	Grafton.
Ohio,	J. U. Lloyd, Court and Plum streets,	Cincinnati.
	George L. Hechler, 1099 Broadway,	Cleveland.
	Charles Huston, 47 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
Oregon,	Louis Blumauer, Fourth and Morrison streets,	Portland.
Pennsylvania,	Jacob A. Miller, Second and Chestnut streets,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 5 North Ninth street,	Lebanon.
	Richard M. Shoemaker, Fourth and Race streets,	Philadelphia.
	George A. Kelly, 101 Wood street,	Pittsburg.
	Philip M. Ziegler, 526 Penn street,	Reading.
	Edward A. Cornell, Fourth and Pine streets,	Williamsport.
Rhode Island,	Wm. H. Cotton, 226 Thames street,	Newport.
	Wm. K. Reynolds, 354 Friendship street,	Providence.
South Carolina,	Oscar E. Thomas, 164 Main street,	Columbia.
Tennessee,	Jas. S. Robinson, Second and Madison streets,	Memphis.
	James O. Burge, Church and High streets,	Nashville.
Texas,	Geo. J. F. Schmitt, 507 W. Commerce street,	San Antonio.
Utah,	Frank A. Druehl, Main and 3d South streets,	Salt Lake City.
Virginia,	T. Roberts Baker, 3101 East Main street,	Richmond.
Washington,	Henry E. Holmes,	Seattle.
Wisconsin,	Edward Kremers,	Madison.
	John R. Drake, 365 East Water street,	Milwaukee.
Wyoming,	Emanuel Stuver,	Rawlins.
Prov. Nova Scotia,	William A. Simson, Pentagon Bldg.,	Halifax.
Prov. Ontario,	John A. Clark, E. King street,	Hamilton.
Prov. Quebec,	Henry R. Gray, 122 St. Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually, in the Proceedings, a brief history of the origin, money value, and use to which each Fund may be applied.

There are three permanent Funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution, as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee, and, after consideration, adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II., Section 7 (afterwards Section 8), contained the following provision:

"Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings 1870, pp. 87–96), and is in force at the present time, containing the following:

"Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*"

Chapter VI., Article 5, of the By-Laws adopted the same year, reads as follows:

"Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions."

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) and again in 1896 (Proceedings, page 17) so as to apply also to those who have been members for over twenty years (see Chapter VII., Article 4 of By-Laws). Under this clause the life membership (new style) of the present roll is sixty-one, as published in the Proceedings.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884

(p. 524) $944.14. At the Milwaukee meeting, held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the Life Membership Fund. At the Providence meeting in 1886 (Proceedings, p. 147), it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3,000 be transferred from the general fund to the Life Membership Fund. At the Cincinnati meeting in 1887 (Proceedings, p. 471), the Association ordered again a transfer to the same Fund of $4,000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the Life Membership Fund is invested. The report published on page 94 of the present volume shows that on July 1st, 1898, the value of the Life Membership Fund was $11,273.69 (face value of securities only given), of which sum *the annual interest only shall be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, p. 58), Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products: the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize.*

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers; for 1888, to Jos. F. Geisler; for 1890, to Wm. T. Wenzell; for 1891, to John U. Lloyd; for 1897 to Albert B. Prescott and Jas. W. T. Knox; and for 1898 to Virgil Coblentz.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On July 1st, 1898 (Proceedings, p. 94), its reported value was $760.73 (face value of securities only given). The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees, on settling all accounts for the entertainment of the Association, had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually incurred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*Ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting (Proceedings 1880, p. 553), when $582.81 had thus been received. In the following year a committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII. (Proceedings 1881, pp. 190, 549). Members have not availed themselves of this Fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885; $96.80 used by the Committee on National Formulary during the years 1886 and 1887 (Proceedings 1889, page 16); and $32 to Edward Kremers for material necessary for the prosecution of scientific research on the menthol group, reported in the Proceedings for 1892, $50 to the same investigator in 1893, and $50 again to the same investigator in 1894. In 1896 the sum of $22.33 was paid to the Committee on Indicators for material used in their investigations.

The original sum of $1117.81 ($525 + $582.81) had increased in 1883 to $1232.76. Since 1887 the securities in which the Fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1447.58 (face value of securities only given) on July 1, 1898 (see Proceedings, p. 94). *The interest accruing from this Fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

THE GENERAL FUND.

In October, 1891 (see Proceedings 1892, page 13), the Council instructed the Treasurer to draw from the cash on deposit a sufficient sum and purchase therewith three bonds, one thousand dollars each, the same to be such bonds as shall be approved by the Finance Committee, said bonds to be registered in the name of the Treasurer of the American Pharmaceutical Association, and placed in the custody of the Chairman of the Council.

The investment was made in bonds of the American Security and Trust Company at Washington, D. C., for the sum of $3021.62 (see Proceedings 1892, pages 27 and 28). On July 1, 1897, the above bonds were redeemed, and six (6) 4 per cent. bonds of the same company, each for $500.00, taken at par and accrued interest.

PRIZES.

The resolutions adopted August 15, 1893 (see page 16, Proc. 1893) were amended September 1, 1898 (see page 98, Proc. 1898) to read as follows:

Resolved, That if worthy papers be presented, the Association award annually three prizes for the three most valuable papers, aggregating the sum of $100.00, and apportioned as follows: $50.00 for the first, $30.00 for the second, and $20.00 for the third prize.

Resolved, That a Committee of three be annually appointed by the President of the Association, their duty to be, first, to decide if one or more of the papers presented are worthy of a prize, and second, to decide upon the relative merits of such papers as are deemed worthy.

Resolved, That nothing in these resolutions shall be so construed at any time as to prevent the writer of the Ebert Prize paper from also receiving one of the Association Prizes for said paper.

The following resolutions were adopted September 1, 1898 (see page 98, Proc. 1898).

Resolved, That a prize be established to be known as the "Hermann Hager Memorial Prize," and of the value of $50.00. That in bestowing said prize, preference shall be given to contributions on pharmaceutical science or art, as distinguished from those on allied branches, though it shall not be confined to such. That said prize shall be awarded only when, in the opinion of the Committee on General Prizes, a contribution shall be deemed worthy of the award.

Resolved, That a prize be established to be known as the "John M. Maisch Prize," of the value of $50.00. Said prize to be awarded for research work in pharmacognosy, only on the recommendation of the Committee on General Prizes.

Resolved, That no one of the general Association prizes shall be awarded to the writer of a paper for which either the Hermann Hager Prize or the John M. Maisch Prize has been given.

For names of members of this Committee see page v.

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PREFATORY NOTICE.

At the forty-second annual meeting of the Association held at Asheville, N. C., the Council determined that the distribution of the printed Minutes, together with the papers read at the meeting, in advance of the bound volume of the Proceedings, which plan had been in operation since 1891, should be discontinued. This action of Council was approved by the Association at large at the General Session held September 8, 1894.

With the view of securing for the Proceedings as wide a distribution as possible, and to enable members to complete their sets at very low figures, the Council, at the forty-third annual meeting held at Denver, Colo., decided that the price of the Proceedings for 1890 and all previous years be reduced to one-half of that heretofore published. The Association at the General Session held on August 20, 1895, approved the action of Council, and the Committee on Publication offer the different issues at the following rates:

		PAPER COVER.	BOUND CLOTH.
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1884, 1885, 1886, 1887	"	1.75	2.00
1888, 1889, 1890	"	2.50	2.75
1891, 1892, 1893	"	5.00	5.50
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1856 and 1859 are out of print; none published in 1861.

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1865	12	3 90	2 63	1879	26	18 90	9 45	1893	40	57 65	23 06
1866	13	4 65	3 26	1880	27	20 40	10 20	1894	41	64 15	25 66
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Orders for Proceedings should be sent to the General Secretary, 109 Aisquith street, Baltimore, Md.

The gold badge of the Association may be procured from the General Secretary on receipt of $2.

Blank forms of applications and recommendations for membership may be obtained from the General Secretary or from the Committee on Membership; when properly filled up they should be sent to the Secretary of the Committee on Membership, Geo. W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to him in the care of the Local Secretary, Lewis C. Hopp, 198 Euclid ave., Cleveland, O.

The forty-seventh annual meeting of the Association will convene at Put-In-Bay, O., on the first Monday (4th day) of September, 1899, at 3 o'clock p. m.

MINUTES

OF THE

FORTY-SIXTH ANNUAL MEETING

First Session—Monday Afternoon, August 29, 1898.

The forty-sixth annual convention of the American Pharmaceutical Association was held in the city of Baltimore, Md., August 29–September 3, 1898, and the sessions were held in Lehmann's Hall, North Howard street. The first session was called to order at 3 o'clock p. m., August 29th, by President Henry M. Whitney, of Massachusetts.

The President remarked that he thought the agreeable and proper thing to do at the opening of this the first session, would be for the members to make the acquaintance of the Local Secretary, Mr. Henry P. Hynson, under whose care and direction they would be while in Baltimore, as to the entertainment features of the meeting. He spoke of the hard work done by Mr. Hynson and his fellow-committeemen, commended him upon the success of his labors, and assured the members of the Association that they were in excellent hands.

Amid applause Mr. Hynson stepped forward to acknowledge the introduction, and said :

Gentlemen of the American Pharmaceutical Association :

The President has said many complimentary things, but I am forced to confess that his report to you is not exactly sustained by his orders to me. When he was directed to mobilize his forces here in Baltimore at this time, he proceeded in his usual prudent way to make preparations for the encampment. He thought it well to select a Commissary or Quartermaster-General for the immediate neighborhood, to make preparation for your subsistence while here; and, upon the advice of the General Secretary—who, as you well know, desires to maintain the dignity of this Association, I have been selected. (Laughter.) It was on that account entirely. General—I will call him General, because he likes to be called that—General Whitney has ordered me to report to you. He has refused to receive any report in person, but has charged me to report to you the condition of affairs hereabouts. He wants to know whether he and his followers can receive peaceful lodging here, and whether or not the conditions are favorable for an all-summer's encampment. Gentlemen, I am fortunate in being able to present to you one who can speak with authority to represent the city and the citizen, the professional man and the business man, the wholesaler and the retailer—a man who is a splendid entertainer and efficient mayor—a man who was one of the builders of our matchless navy. Gentlemen, I introduce to you the Hon. William T. Malster, Mayor of the city of Baltimore and President of the Columbian Iron Works. (Great applause.)

Hon. W. T. Malster spoke as follows:

Ladies and Gentlemen and Members of the American Pharmaceutical Association:

What a truly wonderful age is this in which we live? What discoveries in medicine, and in the applied sciences in so many important fields, are so constantly challenging inquiry and rewarding investigation? I take it that in no department of scientific inquiry have more pronounced advances been made than in pharmaceutical chemistry. It has fully kept pace with the magnificent triumphs of medicine and surgery, of which the last half of this century has been so prolific, and to the solution of its constantly recurring problems, the force of the master-minds of our day has been successfully directed.

While every civilized country of any importance has had its National Pharmacopœia, it is a source of pride and congratulation to us as Americans, that the pharmacists and chemists of the old world have long since recognized and conceded the high standard and value of the Pharmacopœia of the United States. I believe the fact justifies me in asserting, that in the honorable notice of the most distinguished members of the medical profession of Europe, although not so old, it ranks equal to those of England, France and Germany.

Now, when we reflect that the primary object of the scientific labor of your profession is a purely humane one, to cure disease, relieve suffering and alleviate pain, its dignity and character constitute an irresistible claim upon our respect and consideration. And yet, notwithstanding its high character, it is probable that no class of scientific workers receive, as such, so few marks or evidences of popular appreciation as the pharmaceutical chemist, popularly known among Americans as the druggist. And the reason is obvious. However skilfully compounded or scientifically prepared his remedies, no one voluntarily becomes a medicine-taker. The gruesome picture of the ancient apothecary, he of the pre-historic mortar and pestle, surrounded in his gloomy laboratory by the uninviting accessories of his trade, o'er which the blinking owl, the Solomon bird of mystery and silence presides, still haunts the human mind and suggests the doubts, the fears, the hopes and the failures of the speculative alchemists.

> " Away with your physic,
> I'll none of it."

Hence it is that the prompt and deserved appreciation of the scientific chemist's labor and discoveries is limited to the learned few; the profound physician, the keen-eyed and firm-handed surgeon, he it is that accepts at their full value the gratifying results of the sublimating processes of the scientific chemist. The glittering plate and silver, the sparkling soda fountain, the cut glass aud perfumed atmosphere of the modern drug store, may fill the popular eye and the popular nostril. But to the thoughtful and reflective, back of the glamor and glare, the necessary insignia of competitive commercialism, stands the skillful compounder, the careful dispenser of pure remedial agents, upon whose technical education and professional intelligence the issue of life or death may depend, should disease or accident o'ertake our loved ones. What meets it how efficacious the drug if blunderingly or ignorantly compounded or dispensed? Here the careful hand of wisdom and legislative authority intervenes for the public good. The adulterator of drugs rests as fully under the anathema of public opinion and the law, as he who adulterates the food we eat. And herein, after all that may be said in favor of educated graduates in pharmacy, of registered licentiates to compound and dispense medicine, lies the highest and best work of your Association, in protecting the people against the dishonest dispenser of impure drugs, the mountebank, the empiric and the quack.

I am an earnest advocate of education, secular, religious, professional and popular. Let the rudimentary education of the public school end only in the college and the university. The public intetest demands that every agency that administers to its wants should be vested in the hands of those educated and trained in its special requirements. As has been well said by one of your members, "Of all known occupations, that of the pharmacist is most dangerous to the public welfare if improperly exercised by men not fully competent and alive to the necessity of eternal vigilance."

Consider for a moment the possibilities for evil in the hands of the thirty thousand druggists in this country. If one-half of them should be uneducated, unskillful and careless, who can compute the dangers to which every man, woman and child is exposed, in the thousands of unfortunate communities, inflicted by incompetent and reckless dispensers of poisons labeled "Medicine?" The educated chemist and druggist is the needed professional associate, the essential fellow-worker with the educated physician. The public interest can tolerate no other. Because your Association is protective and conservative along the lines indicated, and its aim to elevate and maintain the standard of individual acquirement of pharmacists, it deserves our cordial sympathy, aid and support.

Gentlemen, in the name of the hospitable people of this beautiful city, I welcome you to Baltimore, and hope your Forty-sixth Annual Session may prove a pronounced success, exceeding in profit and influence those that have preceded it.

There was great applause following the Mayor's address.

Mr. Hynson: When I told "General"-Whitney that the city's welcome would be given by the Mayor, he said, "That's all right so far as it goes, but that is not enough. We want to know how our special hosts, the drug trade of Baltimore, feel." Therefore, ladies and gentlemen, I take great pleasure in introducing to you a true representative of the drug business, Dr. A. J. Corning, of this city.

Mr. Corning: *Mr. President, Ladies and Gentlemen:* We are all creatures of accident. When the apple fell upon the head of Sir Isaac Newten, the great discovery of the law of attraction and gravitation was made. When a boy stood in the crowd and threw a rock up in the air, the man on whose head that stone struck was thoroughly convinced of the force of that law. Gentlemen, when your committee, in preparing this programme, came to act, they found they had some honors to dispense; and not wishing to do injury to the feelings of any one—not wishing to raise any jealousies—they threw these honors into the air, and one of them hit me on the head, and that is my excuse for being before you to-day. (Laughter.)

This committee, with wonderful ingenuity, have prepared the programme that I hold in my hand. It requires some explanation. It is true, they have a lot of scientific papers and other things to be read here, but as we propose no interference with the pleasures of this Association for the coming week, we have put all that in the hands of our President and Secretary, and a few like spirits, and they will attend to that properly—they are trained hands at the business, and like it, and we can trust them to attend to it.

This evening—the first evening—has been devoted entirely to the Committee, so that they can parade themselves before you in dress suits and yon can see how they look. (Laughter.) Then, ladies, I want to say to every one of you that your efforts this evening will be devoted entirely to the committee. If the committee runs short—if you ladies should greatly outnumber them—then you can devote your attentions to the outsiders, but not otherwise. (Laughter.) Let that be remembered.

On the second day we have more exercises—business and scientific exercises—which we have entrusted, as usual, to the Secretary and the President, feeling confident they will be carried out with great credit to the Association—the main object being that all this should make a good appearance in the report—that is all we care about. (Laughter.) We are here for pleasure, nothing else, and these two gentlemen are well skilled in their part, and we may rest in confidence that they will take care of it.

We propose on the next day to take you on a ride through our streets to the Park—Druid Hill Park. We are too remote from the ocean for a sea trip. But we will give you the next best thing to it. If you don't feel satisfied, after riding over our streets, that you have had a ride on the ocean, it will surprise me greatly. (Laughter.) That is one reason we are proud of our streets, and dyspepsia medicines have no sale here. (Laughter and applause.) When we take you through the Park you will know why we are proud of it. Every traveling man going out of Baltimore is instructed to advertise to the fullest extent the beauties and attractions of Druid Hill Park, and we know you are thoroughly conversant with its reputation. As soon as one of these men comes home he has to revisit the Park and replenish his stock of information for the next trip. (Laughter.)

We propose, also, to give you a trip down the bay. That presents some features you will never forget. We will take you across the placid and strong bosom of the bay. I do not think you will forget the experience. (Laughter.) Our fisheries are unexcelled, and when you go away from here, gentlemen, we will—if we have an opportunity—deliver you over to your homes and families in such an improved condition that they will wonder where you have been. (Great laughter.) But that is not our objective point, gentlemen: we propose to take you down to the home of the Spanish Admiral (laughter) and there show you the beauties of that place that every Baltimorean and every Marylander is proud of. In brief, we will show you some antique curiosities that will gratify you. After you have gone there, we will take you home; and if any of you need any guidance, the committee will escort you with pleasure—if they are able—to your respective homes. (Laughter and applause.)

On Thursday evening is a feature that came on me unexpectedly; but that is the only evening that you will be here that you will be allowed to get full to repletion without any injurious effects. Our chemical professor will give you a dissertation on "Liquid Air." (Applause.)

On Friday night we will take you out to our Electric Park. There we will try to fill you full of something else. (Great laughter.) We will try to make it pleasant for you all there.

In short, gentlemen, we hope to make this forty-sixth annual meeting of the American Pharmaceutical Association so agreeable that when you leave, you will remember it for a long, long time to come. We will do our part, and we feel that you will respond to it; and we shall regret you when you leave us. We want you in your dreams at night occasionally to have pleasant visions of the happy and lively time you had in Baltimore. We want you in the daytime, during the exigencies of business, to have a thought for old Baltimore, and the rare good time you had there.

Gentlemen, we are glad to have you with us. We want to show you some of the old-time hospitality for which Baltimore has been celebrated. We believe we can do it.

In the name of the drug trade of Baltimore we bid you welcome! We bid you to our hearts, and we hold out our arms to you, and would fain make you believe you are at home! (Great applause.)

Mr. Hynson: I want to encourage you—this is the last appearance of the Local Secretary. (Laughter.) I feel this though, ladies and gentlemen, while not disposed to postpone important business of this Association, that the eloquent gentleman has not done full justice to a few. I want to say a word for the members of that splendid committee, which closed around me with such sustaining power as to make my way easy and my burden light. I want to call your attention to the willingness and eagerness with which they came to me and offered help and counsel. This will show you, more than anything else, that your advent here is to them a pleasure, real and genuine, in the fullest sense. Not during my whole association with them was one reference made to rivaling or outdoing some other city; the whole desire was to make you welcome, and make you glad you came here. I want to say this much for these gentlemen, because it is due them. (Applause.) I turn my able lieutenants over to you, General Whitney, to do with them as you will; but be assured that their welcome is sincere, full and complete.

And now, how can I say enough in praise of the buds and blossoms, the beauty and grace of Baltimore—the fair women who have come to you with a welcome all their own, with a touch that thrills and a glance of gladness! We men thought to discourage all efforts on their part at organization, because we wanted a chance, and we well knew what the result would be if we did not hold them in the background. This lovely morning they wreathe for you a welcome of fairest flowers as you see here about you: it is blue, it is true. (Applause.)

And now, Mr. President, some reference should be made to those who have gone before. As we reflect upon those noble spirits, many of whom have honored us with their presence upon other occasions like this, methinks we can but "sigh for the touch of a vanished hand, the sound of a voice that is still." Those great hearts have gone on before. As they led us here, they were strong men—as they led us here, they were good men; strong, great and good in the councils of our local association, in the councils of this Asssociation. I recall the names of Andrews, of Thompson, of Caspari the elder, of Russell, of Roberts, of Moore, of Baxley, of Eareckson and of Jennings—and of late, the great Muth. All these have left us and gone. And yet, if soul to soul can speak, I am sure they are whispering to you the gladdest welcome of all.

THE PRESIDENT: *Gentlemen of the American Pharmaceutical Association:* It must be evident to all of you that it would be impossible for me, in my physical condition, to respond in fitting terms to the noble addresses of his Honor, the Mayor, and Dr. Corning. Indeed, I think it would require a more gifted tongue than mine to do so. But as we come from the North, from the South, from the East and from the West, I will ask for responses from the different sections of the country. I will ask Mr. Sheppard to respond for the East.

Mr. Sheppard spoke as follows:

Mr. President, Ladies and Gentlemen, Friends all: This call upon me comes only because a better speaker is not here. I wish that he were, because the welcome we have had demands a hearty and good response—more than it is within my power to give. But my heart goes out in fullness to these good friends who have come here and have given us a welcome that is so genuine and so heartfelt. I think I can speak not only for the East, but for the North, when I say that we all realize that this welcome is true and genuine. There is a something we call *esprit du corps*—we don't know what it is: it is in the air: and here this afternoon you may feel that it is in the air—that the Baltimoreans welcome us from all over the country, from the North, from the East, from the South and from the West. My home is in Boston. If you should ask the good men that come from the far West, they would say Baltimore and Boston were side by side—only a step from one to the other: that Baltimore could not expect one of her own people to respond. That is the way perhaps we may feel; and yet there is a difference, a distinction.

As I understand our President, he wants a response from New England. You know we who have lived in that little corner of the country feel that New England is a special place. You must forgive the Bostonians for the swellhead, because we come down from the fathers; it is not their fault. (Laughter.) Wherever an association meets that represents education and science, and the highest social life, there we Bostonians—New Englanders—want to come, and shake hands, and take part. We believe in it. We believe in education in the strong, broad meaning of the word. We believe in science —for what is science but simple knowledge and truth? What is our social life? It is the bringing out of the very best part of a man or woman: that part of us that comes nearest to our Maker; that part of us which is the soul. And we never bring it out so well and so truly as when we touch hand to hand and shoulder to shoulder with strong minds and true, like those who have spoken to us to-day. Gentlemen of the Association, I am trying to speak for New England, and to say we are glad to be here—glad to receive and accept this Baltimore welcome, because we know it is warm and cordial; and we accept it in the same way it is given. We know we shall have a good time here in Baltimore—we know we shall have good treatment; and we know we shall return to our homes better men and better women for having come. We know that the influence of this gathering is to be good for us all; and we desire to thank you, ladies and gentlemen of Baltimore, for your warm and cordial hospitality so graciously extended. (Great applause.)

The President: Dr. George F. Payne, of Atlanta, Ga., will respond for the South.

Dr. Payne: Pharmacists and citizens of Baltimore: We thank you for the cordial welcome which has just been conveyed to us in such expressive words.

Our profession, like our glorious union of States, knows no east, no west, no north, no south, except only as geographers may define and limit it. But to show you how hearty and how general is our appreciation of your welcome, we wish to answer it by acknowledgments from widely-distant sections of our American continent, and I have been selected to reply for "The South."

Ah! what memories the words "The South" bring crowding upon each other in the mind of a Georgian, who lived through that mighty struggle to establish into an independent government what is now only a geographical section of our great Union! How our southland rang with the words of the song, "Maryland, my Maryland!" And not only then, but always, have our people looked to Maryland and her grand metropolis as something unusually excellent, to be longed for and sought for; and as a drug market to-day our pharmacists still consider it unexcelled, and always up to date.

You have bid us welcome to your glorious city, with its beautiful women, its splendid bay, its lovely parks, its attractive drives, its historic spots, its ably-conducted college of pharmacy, and its magnificent scenery; and even your oysters and your terrapin have welcomed us, and have already filled us with the most delightful sensations of enjoyment. (Laughter and applause.)

We from the land of sunshine possibly cannot show as many members of our Association here to-day to enjoy your hospitality as may some other sections; but the heart of the southern pharmacist is with you, though the distance being long and his purse being feeble may make his flesh seem weak. It may appear that, in our part of the country, we lie upon a bed of roses, in a charming climate, where the orange, the peach and the watermelon make man happy—for only in our larger cities does the cutter attempt to absorb unto himself all the patent medicine business, vainly hoping that he may secure it all, and thus realize something from its microscopical profits. In Georgia there are only two or three cities where severe cutting prevails; but this does not indicate any lack of progressiveness on our part, but rather that our section, with its equable climate, is remarkably free from many chronic ailments which are the boon of proprietary cure-alls; and while pharmacists are many, customers are few. People are not so lazy, nor is money so easy to make with us as some at a distance appear to think; hence, we have some very close buyers ourselves, who are desperately anxious to get all to which they think they are entitled. When a boy, I remember on one occasion my father was compounding a prescription for a tall, consequential-looking gentleman, who peered at him over the prescription-case as my father cautiously weighed out the tiny quantity of strychnine required. "Give me down weight, doctor—give me down weight!" he called out. My father paused, glanced up over his spectacles and replied: "If I give you down weight, in fifteen minutes you will be in h—!" (Great laughter.)

We have many drug stores in the South, and our colored folks furnish considerable patronage. The negro is a customer with queer demands. He has no respect for a druggist that don't know how to make "love powders." He is a fine customer for loadstone, for that brings him luck; for shark's liver oil to "an'int his jints;" for "early-bird" vermifuge, and "early-riser" pills. (Great laughter and applause.) He tries to keep up with modern ideas, too, and his conglomeration of facts sometimes gets mixed in a way wonderful to relate. A friend of mine, the State School Commissioner of Georgia, recently addressed an audience of several hundred colored people upon modern progress, and the importance of mechanical and industrial knowledge in these great discoveries. After the speech was over, an old-time darkey, with a fringe of white whiskers all around his face, came up to him and said: "Look yer, Mar's Glenn, you done got me all mixed up about dis here ray bizness. Does you mean to say dat a white man ken look rite into a nigger's stummik." "Yes." "En see what's in it?" "Yes." "En tell whether they's chick'n in it?" "Yes." "En now, boss, what I wants to know is, ken he tell whar dat chick'n kum from?" (Great laughter and applause.)

From Maryland to Florida, and from Texas to Missouri, our southern members come, and as southerners we are proud of the welcome extended by a southern municipality; but far beyond this, as Americans and as members of our great American Association, we are full of appreciation of the royal welcome of your grand American city—a city which, if it should be caught up into heaven to-morrow, would ever live in the memory of pharmacists as having produced a Dohme, a Simon, a Culbreth and a Caspari. (Applause.)

Your stately monuments show your appreciation of the deeds of noble men. Francis Key drank of the inspiratian of the winds that sweep over the Patapsco, and penned "The Star Spangled Banner;" Schley first breathed the breath of life in Maryland, and lived to destroy Cervera's proud Spanish fleet (applause); and, God willing, we ourselves shall draw such inspiration from your splendid pharmacists and magnificent institutions as that we shall return to our several homes deeply imbued with the magical influence of your glorious Baltimore! (Great applause.)

The President: I will call upon Mr. Mittelbach, of Booneville, Mo., to respond for the West.

Mr. Mittelbach: *Mr. President, Ladies and Gentlemen:* This certainly is unexpected. I do not think I can half represent the great West. I will say this, that I have looked forward to this meeting with some pleasure. I had always heard that Baltimore was famous for her hospitality. You have heard of the "Missouri Idea." That expression has become famous over this whole country. It is this same idea, I see, that exists here in Baltimore. It is mixing pleasure with business—with science. That is the only way and the true way to make these meetings successful and draw the attendance. When we passed over the Alleghany mountains yesterday morning early, it seemed to me I could feel the air of hospitality embracing me long before we reached your city. I have felt it ever since I have been here, and I assure you I shall never regret having come here; and on behalf of the other members from the great West, I certainly thank you for the cordial welcome that has been extended not only to us, but to all; and if it ever should be our pleasure to receive any of you in the great State of Missouri, at Missouri meetings, you will never regret seeing us there. That is our way of transacting pharmaceutical business, mixing pleasure with business; and it is the only true way. (Applause.)

THE PRESIDENT: We have one member who is a General, a Commodore or an Admiral, and whatever duty he is called on to perform, he performs it with credit, always. I have great pleasure in introducing to you, gentlemen, the last speaker to respond to our welcome—Mr. Joseph P. Remington, of Philadelphia, who represents the North. (Applause.)

MR. REMINGTON: *Mr. President, Ladies and Gentlemen:* I am very happy, indeed, to add a word to the many good and true words that have been spoken on behalf of the work which has been done by the Baltimore members for our entertainment and for our good as well.

Mr. President, when I heard you calling for representatives from the North, from the East, from the South and from the West, the thought came to me, "Will he not call for some one to say a word for America?" (Great applause.) We are in America now. We have no North, no South, no East, no West. From the time Dewey won that great victory in Manila Bay we have all been Americans! (Applause.)

I never dreamed that the lightning of being called on to speak would strike me, but now that it has, I cannot help saying a word of thanks in the name of our Association. At the college meeting a few months ago, I went to our old Philadelphia friends and said to them, "You must get a big delegation and go to Baltimore. The young fellows will go anyhow, but you older men should go there and meet your old friends. It will do you good, and it will do the Association good." And they are all here, and I head the list! (Laughter and applause.)

THE PRESIDENT: I know you must be weary, gentlemen, and in no condition to stand the long sermon that is prepared for you, and I declare a recess of five minutes before reading my address.

After a short recess, the convention was called to order again. The President invited First Vice-President Bartells to take the chair, while he proceeded to deliver the following address:

Fellow Members of the American Pharmaceutical Association:

Ladies and Gentlemen: In accordance with the usual custom, the address of the President is in order. Article 9 of the By-Laws requires the President at each annual meeting to present an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may seem to him suitable to the occasion. It has seemed to me impossible, in a brief address, to present even a fractional part of the facts and events as well and intelligently as it will be done by the Reporter on the progress of pharmacy, and has been done by the pharmaceutical press. The discussion of scientific questions in its strict sense, it seems to me, is properly the province of the Scientific Section. How shall I properly comply with the by-law? was to me a serious question.

"The ancients reckoned seven sciences," and Pope writes,

> "Good sense, which only is the gift of Heaven,
> And though no science, fairly worth the seven."

So, with your permission, and trusting that the heavenly atmosphere surrounding us will save me from too severe criticism, I will try to find out, by careful analysis of the present, if the good sense of the Association has been exhausted, and if we may not so harmonize, unify, and increase its beneficence that a larger number may share the blessings we enjoy.

It would have been a pleasure to me to have prepared a brief review of the organization and progress of this Association; but as this is to be done by abler hands and in full detail in 1902, when we celebrate our fiftieth anniversary, I shall only call attention to a few points which have made the American Pharmaceutical Association to me one of the most delightful, attractive and helpful organizations I have ever been connected with. It has not been my privilege to attend all of the annual meetings, but when present, I realize how much I have lost by absence.

That this Association was started and has continued with high aims, broad views. on elevated and educational lines, and has commanded the services, attention and labor of many able and wise men, as well as the respect, appreciation and welcome of the highest educational institutions, and largest cities, is attested by a study of the annual Proceedings.

If time permitted, it would be a special pleasure to recall those members who have honored us by their presence, and honored themselves by freely giving to the less fortunate the result of their studies and manipulations, the educational influences of the places visited, and the social, helpful power acquired by strong ties of closest friendship.

While as a member I rejoice in the personal advantages secured, I must extend my sympathy to those who are not members, and my regret that so many of our craft are blindly or foolishly neglecting and rejecting dividends larger and better in every way than can possibly be secured by any other investment of time and money.

I know of no way by which, in fewer words, I can convey to you my estimation and appreciation of the value of this Association, than by quoting in part the description of a painting that may be seen at the Providence Atheneum. It is a small painting on ivory by Malbone, of exquisite delicacy and beauty, called, "The Hours," representing the Past, Present and Future.

"The artist has depicted the Hours as three lovely maidens: the Present standing in the brightness of the foreground is beautiful in the consciousness of the pleasure of the hour, and the untried vigor of her youth; the Future is following close behind her sister, and the joyousness of anticipation is shown in every feature, with no shadow of disappointment to the brightness; but the Past, although no less lovely than her sisters, leaving all behind, is retreating regretfully and lazily into the shadow, but seems to linger for a moment, while the light of the Present falls upon her."

Thus, it seems to me, it is with this Association. The past, present and future of the American Pharmaceutical Association will give to the coming artist—a painter or writer—an ideal of unselfish work, scientific research, helpful, social and educational progress.

As one of the less than fifty living members prior to 1860, and therefore properly classed as of the past, I unhesitatingly declare that this Association has been, is, and will continue to be, one of the leading educational, guiding and helpful organizations, of special value to its members, and of unparalleled service to humanity.

Every meeting has had its own peculiar features or lesson in its *social* and *pleasure-giving* efforts, and is usually arranged to add to the value of the special work of the Association, and take nothing from it. Locality and environments have, of necessity, much to do with the attraction of members, and if, as at our last meeting at Lake Minnetonka, a beautiful suburb of the twin cities, we were led captive by the ladies' auxiliary, we surely learned that the selfishness and cruelty of man was not equal to the power of woman to change a day of apparent disappointment into one of unalloyed joy and restful pleasure.

This year we meet in the far-famed city of Baltimore, claiming the finest natural park in the world, and also claiming as one of her suburban attractions, the beautiful city of Washington. We all have seen and can appreciate the climbing Baltimore Bell, the sweet-singing yellow breasted oriole, equaled only by the belles of Baltimore, whom we have seen and heard in the past, who now in their own city may give us visions of beauty and songs of welcome, enticing us from labor to refreshment for the soul and rest from dull care. I trust no one of the several Sections will utter words other than those of praise. For surely, as these golden links, which most of us wear, bind us to a happy memory of the past, so let the social or entertainment part of our meetings prove the connecting link between labor and acts of love and kind hospitality, and our Association continue to be the power that influences our professional life, controlling, if not destroying, the germs of worry and anger.

Preparatory to what will follow, I wish to say, as your President, that I have felt it was my duty to present the conclusions at which individually I have arrived, and make suggestions. It is your duty to accept or reject them; and while I may be enthusiastic, you must, or should, be calmly judicial. This is not a political body, and there are no party obligations. There should be no coterie—social, commercial, scientific or educational—that will relieve any one from individual responsibility to speak and vote as his own personal convictions and judgment approve. I beg that no one from *mere courtesy* will accept a single conclusion or suggestion I shall make. Let this be a strictly deliberative body, and every member recognize his *individual* responsibility and his obligation to the Association as a whole; for surely, no wise progress will be made by blindly clinging to the skirts of any leader.

If, in expressing my views, there should seem to be any personal allusion or criticism, I wish to disclaim any such purpose. If the language should seem hard, crude, or lacking in polish or policy, I ask you to remember that I am not writing for fame, but simply to present a few points of possible value or interest to the Association and for your consideration, and as coming from one who strongly inclines to the optimistic view, and is opposed to the too general pessimistic cry.

We have three sections, Article 2d, Chapter 8:

1. On Scientific Papers.
2. Commercial Interests.
3. Pharmaceutical Legislation and Education.

Article 16, Chapter 8, provides that the Council may arrange for a social session after the last general session; but the Council has, upon the request of the local secretaries (and it appears to me wisely), permitted many entertainments of a social nature to come prior to the last general session. This action, I am sorry to say, has too often given occasion for apparent jealousy, unkind remarks, a strong, and I fear growing tendency, to divide the interest of the members, and thus contribute to a loss of interest in the general work. It is true, some of us attend these meetings with more interest in one Section than another; but are we not cultivating and encouraging by our noticeable absence from one or more Sections a selfish, independent spirit, and antagonizing the declaration in our constitution that says: "Our object is to promote the public welfare, and tend to *mutual* strength and advantage"?

I do not believe that the gentlemen who with much labor and exhaustive investigation prepare scientific papers, come to our meeting simply and solely for an interchange of thought and battle royal among themselves; but, on the contrary, from a personal acquaintance with many, I am sure their aim and purpose is an unselfish and an honest effort to reveal some of the hidden mysteries, and harmonize some of the apparent contradictions, and they should be encouraged by appreciative hearers. It is not strange that scientific words and classical terms should be used almost exclusively by them in presenting the facts and results they have gathered. What if they do oftentimes preach over the heads of the average layman? All of us can gather a few crumbs of wisdom that fall from the lips of these savants. And how often could the earnest student, or even the mere tradesman, by personal attention or inquiry, obtain the solution of a vexed problem with which he has been struggling!

Give to these faithful workers and writers the attention which their professional but free service in the cause of education entitles them to receive.

I am more and more impressed with the value of the Scientific Section. The able papers by these scientists, published in our Proceedings, exhibit a study and research far beyond the ability or time of the average pharmacist; and I desire to place upon record my more than grateful recognition of their services, with the assurance that if upon certain occasions their audience is small, their labor is not lost, for many members in the quiet of their homes, or in their places of business, free from the allurements of tempting pleasures, do read these papers, appreciate and honor the writers.

To these gentlemen I would say, do not be too lofty in the high altitude of your special calling as instructors, and neglect the Commercial Section. For if there is no commercial value to come from your instruction, your clientage will be small, and even a professor cannot live by words alone. Encourage and aid by your presence and interest those who are striving against odds to make attractive the ranks for which you are furnishing recruits.

COMMERCIAL SECTION.

As we have made a new departure in our Commercial Section by selecting an arch and successful cutter to tell us how he does it, I do not wish to anticipate his labor, as it is possible he may give us a chapter on evolution, with a practical illustration of the survival of the fittest. But as I am satisfied this Section should be an attractive and drawing one at this time, and has received much abuse in the past, I desire to say a few words that you may be prepared for the broadside we are likely to receive.

In considering our commercial relations, and particularly the "cut rate" evil, as it is termed, we must not forget the conditions as they exist to-day, and the rapid changes in every calling that have taken place during the last twenty or thirty years.

Strange and almost inexplicable as it seems to us of to-day, no less an authority than the late Honorable Daniel Webster stated in Faneuil Hall, Boston, less than sixty years ago, "that the Rocky Mountains were a natural barrier, another nation, another people, with different interests, would occupy that territory." Who of us would be willing to go back to the old days of the stage coach, or how many would be here, were it not for our Transportation Committee, rapid transit, and efforts of our Local Secretary in providing elegant quarters at greatly reduced rates? I sometimes feel that in our growlings, it is a case of "the pot calling the kettle black."

Again, what has been the trend of the last twenty years? Have not combinations, trusts, manufacturers, and all, or nearly all industries been forced to smaller margins? Have we, as retail pharmacists of this Association, been true to ourselves, or have we, as a whole, blindly trusting to our bigger brother, the jobber, been so sadly disappointed that in our weakness we have appealed to the manufacturers, with the result that they, with their allies, the dispensing physicians, have boldly defied us? Have we bravely and honestly striven to maintain the high and honorable position our calling demands, or have we in fancied security permitted and submitted to the smirch of the saloon with its inevitable results? I leave these thoughts for your careful study; and when, on Tuesday evening, we go to our Jacob's well, if we do not get the living water, we will, I hope, have presented to us the Moses that can guide us out of the bondage of our taskmasters, and map out the road to more milk and money. In *our Joseph*, whose surname is Jacobs, we may find the modern dreamer who will save us from the threatening famine. If so, God grant he may live as did the ancient dreamer, to the age of one hundred and ten years!

If not all this at once, I trust we shall hear in words similar to those of Ben Hur in the famous chariot race, "On, Education! On, Legislation! What, Scientist, dost thou linger now? On, General Sessions! On, all as one! On, on, to victory!" Thus may it be with our new departure.

SECTION ON LEGISLATION AND EDUCATION.

For several years I have felt we were losing sight of one very important point in the consideration of subjects coming before this Section. It is true our Association is a national one, and all efforts naturally tend to an ideal for the whole country; but can we not make more rapid progress by recognizing the apparent impossibility of controlling under one general law the varied environments, conditions and laws of the several States?

One of our leading senators quite recently uttered these words: "The absolute freedom of our States was the cause of the security of this great country. It was one of the most wonderful things that the States of our country had preserved so many distinct characteristics when they have so much in common with the national government."

However desirable it may be, as some see it, to have an interchange of certificates of registration, a fixed and defined preparatory education, definite rules for all Boards of Pharmacy in their make-up, rigid control or no control over the sales of spirituous liquors, or the absolute prohibition of the sale of whiskey or brandy by pharmacists, restrictions upon the sale of all or a few of the poisons, etc., is it wise to work or wait for the ideal, or, as Prof. Oldberg and Prof. Hallberg have kindly done, to prepare the ideal in elaborate form and full detail, and advise each State by itself to secure as much of it as it can?

I desire to call special attention to the very able and exhaustive paper upon this subject by Prof. J. H. Beal, published in the Proceedings for 1896. I do not believe any man has done more loyal work than he, and my purpose is simply to have formulated the ideal or model of approved excellence at the earliest date possible, and from this, let every locality draw such inspiration and assistance as circumstances will permit.

It seems to me, much time would be saved, more rapid progress made, if we would keep continually in mind the tenacity with which most of our legislative bodies hold to their individual rights. Most men will stand by their own creation, even if a better one is offered, because of the usual pride of origin or personal paternity. Besides all this, I fear we are unintentionally conveying the impression that our way is the only way, and it must be this or none. If only an entering wedge can be secured, faithful work will be followed by public sentiment demanding more and more, and in time the ideal or model will be adopted.

THE COUNCIL.

The Council was made up by a selection of nine members from the Association; now three are selected annually to take the place of the three retiring, The *ex-officio* members are the President, Vice Presidents, General Secretary, Local Secretary, Reporter on the Progress of Pharmacy, the Chairmen of the several Sections, and the Secretary of the Council—twelve: twenty-one in all. Upon these leading members and officials the success of our Association very largely depends, and when a member or members desire they have the right to attend the Council meetings, making it possible for the Council to delay any Section or general session. To hold a meeting of the Council during any session of the Association, or when any section is in Session, does not appear to me to be wise or in accord with our By-laws. I hesitate to offer even a suggestion to such combined wisdom as compose the Council, but feel it a duty to request them, if possible, to arrange for a daily morning meeting of the Council between 8:30 and the hour of morning session, and in the evening, when necessary, after adjournment of the session of the day.

ANNUAL PROCEEDINGS.

Delay in mailing a copy of the annual proceedings still continues a source of annoyance and complaint. There are members who cannot be present, who rely upon the published proceedings; many who are present cannot carry away all that has occurred. Six to eight months delay in such a rapid age as we are living in must of necessity lessen the interest and value. Who is responsible?

I find Chapter 8, Article 9, says: "The Council shall furnish them." Chapter 9, Article 4, says: "Papers must be finished previous to the first session." Chapter 5, Article 4, provides that the Report on the Progress of Pharmacy shall be in form fitted for the printer at the annual meeting. Chapter 5, Articles 1 and 2, By-laws of the Council, say, "Five members of the Council shall be elected by ballot, to have charge of the publication and distribution of the report of the proceedings."

These By-laws seem to cover all that is necessary as regards the papers and Report on the Progress of Pharmacy. The putting in form for the printer the records of the several Sections, I assume, belongs to the several Secretaries, and all to be revised by the General Secretary. From 1889 to 1898, the average delay has been about seven months. In 1889 it was 4⅔ months; in 1892, 8⅓ months; in 1893, 8 months; in 1894, 8½ months, with a temporary secretary; in 1895, our present secretary, 7 months; in 1896, 8⅓ months; in 1897, 5¾ months; and in 1898, 6 months. This clearly exhibits the fact that for the three years immediately preceding the present secretary, the delay was an average of 8⅓ months. After a careful study of this matter I am forced to the conclusion that we have got into a rut. Spasmodic efforts, as in 1897, have been made to get out of it, but it has been too much for any one man. I have several letters upon this subject, and if the Association will instruct the Council, if possible, to have the Proceedings ready for distribution in 60 or 90 days after the adjournment, I will try to point out to them how it can be done.

MEETINGS AND SECTIONS.

I suggest that every session shall be called to order promptly at the time named, and that Article III., of Chapter X., be enforced.

That the General Secretary, with the Local Secretary, shall, on the first day of the meeting, conspicuously post the entire program of the sessions as arranged, and if any changes are made, they shall be noted at once by special posting in the place of meeting, and attachment to the program.

CURRENT EVENTS.

It was my privilege, soon after my return from the Minnetonka meeting, to attend the one hundredth anniversary of the famous old frigate Constitution, launched from Boston in 1797, saved from the junk shop by Dr. Holmes' poem, "Old Ironsides," and now "resting upon the waters into which she rushed as she left the builder's ways a hundred years ago."

As I listened to the thrilling history and glorious achievements of this noble old ship, the courage, skill and wisdom of her brave commanders, Hull, Bainbridge and Stewart, my thoughts wandered to the craft of the American Pharmaceutical Association, and I saw in misty form the faces of Maisch, Procter, Parrish, Taylor, Squibb, and others of our early crew; and recalled the services and loyal contests our ship and crew have had, in creating colleges of pharmacy, battling successfully against ignorance and duplicity, establishing boards of pharmacy to enforce and increase educational work and check any possible piratical craft, like the quiz book and cut rate personal cramming. We have many instances in Massachusetts of those ways that are dark, even to the taking of an examination by an expert for the would-be pharmacist, for which offence each man paid the penalty of six months' service in the house of correction.

Facts of this sort crowded one upon the other, and in the quiet of the evening fireside, my thoughts still upon the history of the old frigate and her would-be destroyers, I was startled by the murmurings, flippant words, and cheap talk heard or read, and the possible breaking up of *our* craft, the American Pharmaceutical Association. Strange, indeed, it seemed to me that at about our age Old Ironsides was assailed. In a flash I recalled the attack upon our Commercial Section as the beginning of the progress of a possible disintegration. Springing from my chair I cried, "Is the history of the Old

Ironsides to be repeated? Ye gods of justice! look down upon this howling mockery and give these craven croakers work to do!" Resuming my seat and line of thought or contemplation of our possible future, ancient Greece appeared upon the scene, and I could not but feel that had commercial wisdom and prosperity guided her, the hated Turk would not now have her by the throat.

What would the pharmaceutical press or any other press, colleges of pharmacy, or even a board of pharmacy, do without the commercial side? Is this, our grand old Association, in danger of becoming a kindergarten for babes, and content with blowing soap bubbles in the air? Are none but those having on wedding garments to come to the feast? Are those of us who recognize the necessity and comfort of earning our daily bread useful only as targets for the wit and sarcasm of those whose ancestors have left them in fields of clover and by the side of pleasant streams? If this be so, I can only say, the best part of them, like the potato vine, is under ground. True it is, "The lilies of the field toil not, neither do they spin," but man! "God created him in His own image, and gave him dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth."

In this boundless gift was the commercial side of the life he gave. Does any person presume to change the divine order? What are science, education, legislation, and all other Christianizing and humanizing efforts but means to an end, and that end commercial prosperity with its attendant power of usefulness?

It seems to me appropriate and proper for this Association at all times, and particularly at the present, to consider fairly, criticisms or complaints of the retail druggists. Many of us can recall the charges made by reputable physicians for selling patent or proprietary medicines; at the same time, who, more than they, largely ignoring the United States Pharmacopœia and relying upon their own private formulæ, certainly encouraged, if they did not inaugurate, the day of proprietary medicines?

To present my point clearly, let me give you one or two cases of my own experience, *fairly* representing the conditions of the earlier period, perhaps worse to-day, particularly in hospital practice, by writing for No. 1, No. 5, No. 8, etc.

A physician of large experience and practice had been for some time preparing and using a cough remedy. It was cloudy, flocculent, and unattractive in appearance. Consulting several apothecaries, he decided to have the compound prepared by the pharmacists, and I have made many gallons for him. Soon it became quite popular, and was generally known as Compound Syrup of Morphine.

One pharmacist, now deceased, conceived the idea of a perfectly elegant preparation, by using a solution of the active principle of one or more drugs used, instead of the crude form. For years it was on that local market, freely prescribed and successfully used as morphine preparations usually are. When it was put upon the general market as a patent medicine, made attractive and commercially valuable by the pharmacist, suit was brought and through the medical journals' *free* advertising of the case, it received a notoriety resulting in very large margins. A physician of most excellent common sense, recognizing the necessity and wisdom of doing something for his patients who had no organic trouble, but from a nervous condition, domestic trouble, or possibly only mental irritability, would not be satisfied unless dosed in some way, had prepared a sort of general remedy, in the line of a lubricator or alterative, that would do no harm and in many cases much good. This remedy became so popular we made forty gallons at a time, nearly every physician in the city ordering eight or sixteen ounces by recipe until it was called for by the patients.

Next we had the charge of counter prescribing. Upon this charge every locality and pharmacist has an opinion based upon facts. If the charge is true in some localities, and under certain conditions, it is not true in many others. I do not feel justified in suggesting any rule of guidance that would be applicable to the varied localities and conditions, other than to "do as you would be done by."

And now comes the solemn warning and protest against *self* medication, for which pharmacists are of course responsible. What are the facts? You all know from data frequently published, the large proportion of prescriptions for unofficial and advertised preparations; many of the older ones thus introduced by the physicians, are to-day common household remedies. The heroic efforts made by many, and the adoption of the National Formulary by this Association, was practically a failure in trying to prevent the rapidly approaching self-medication. Then came the granules, tablets, triturates, pills, etc., made by the barrel or ton, so accurate, so soluble, so elegant, they could be carried in the pocket; so cheap they could be given away, and in many cases so worthless they passed away.

With these facts, and this is simple history, is it honest to blame the pharmacists? We have sins enough, but don't charge us with cutting our own throats when the physicians themselves made a suicidal effort which we could not stop. With so much that is bad, we have reason to be proud of the honest, manly and bold efforts of one of our number, who, addressing the American Medical Association, said: "In considering the study of the effect of drugs upon the human economy, it appears to me that we have to become acquainted with the following facts in order to get at a scientific knowledge of how drugs act. We should know all the constituents of the drug we desire to use; we should know the physiologic effect of every constituent of the drug we are administering, and then use preparations containing only those constituents that produce the effect we desire to produce, and we should know the cause of the effect of these constituents. . . . . How few physicians to-day know the exact effect of the medicine they prescribe on the various organs, and the cause of that effect? They know that jaborandi produces activity of certain glands, resulting in increased secretions thereby, and they know that the pilocarpine in these leaves produces this effect, but do they know what other effects pilocarpine produces on the other organs, say on the blood, liver, kidneys, etc., and do they know what causes pilocarpine to produce this effect? They may say it is not necessary for them to know this, as the effect is produced just the same, and that is all they desire."

This is plain talk, and I rejoice that a Ph. D. of our own number has declared war against those who are continually crying, "I am holier (and wiser) than thou." While I am bitterly opposed to a mere strife of words, I do believe there was a big lesson for all of us when the Master said, "Let him who is without sin cast the first stone."

SPIRITUOUS LIQUORS IN DRUG STORES.

Upon the question of liquor selling in drug stores, I refer you to Proceedings of 1896, pages 306 to 317. Taking a purely commercial and selfish view of the situation as it is to-day, it is easy to understand that the number of drug stores would be largely reduced if no intoxicating liquor could be sold, and the strictly reputable drug store would be the gainer; but can the sale be absolutely prohibited in the way proposed? I leave to each locality the answer to that question. Personally, I feel that there are many most valuable remedies and food products including spiritous liquors, and I know many of them contain a power that may be worse than death; but should the great human family be deprived of the benefits because of the abuse by a few? The locomotive sometimes leaves the track, the steamship is blown upon the breakers, marriage is sometimes a failure; would you abolish them? Is there a better, safer custodian of drugs, brandy and whiskey included, than the pharmacist? Is it not a weakness and worse, a lack of high moral effort, to maintain an independent and defensible position? My point is to maintain the right, dignity and responsibility of our calling as pharmacists. Is it right for us to be a party to the forcing of ladies and gentlemen to the saloon or bar for medicinal supplies? In some of the States a remedy has been successfully applied, and from the results secured in Massachusetts, I feel no hesitation in saying an act placing the sale of spirituous liquors by apothecaries under the control of the Boord of Pharmacy can be made more effective for the cause of temperance, the public good, the best interests of pharmacists, than in any other way yet suggested.

BOARDS OF PHARMACY.

It may be expected I should say something upon this branch or department in which we are all interested. Purely perfunctory work by a State official, as a rule, is not satisfactory either to the official or the public, and this is particularly true when applied to a Board of Examiners, in which common sense, good judgment, and a keen appreciation of justice should always be exercised; and, also, there must be an absolute freedom from any outside influence, political, social, personal friendship or interest. I do not believe any Pharmacy Board can conduct its work successfully unless a majority or controlling part have sufficient enthusiasm, appreciation of the responsibility, with courage to apply their convictions in every case without fear or favor. Every act is a semi-judicial one between the rights of the applicant and the people. The examination should not be to secure an expert chemist, botanist, bacteriologist, or microscopist, or conducted as educational institutions conduct examinations, but to determine whether the candidate is an all-round apothecary, equipped and ready to answer the varied requirements made upon the better pharmacists of the period. Good sense, good judgment, tact and practical experience, with an acquired ability to talk or write so as to be understood, should be absolute essentials. Great care should always be taken to avoid making parrot or quiz-book pharmacists, and the standard should be increased, to keep a little in advance of the average pharmacists of the day. This can only be done by the Boards keeping up with the progress of pharmacy. The executive part of the work must be conducted with wisdom and discretion, not too far in advance of public opinion, nor too lax in its work to command approval and support.

Should it be deemed advisable by members of Boards of Pharmacy who are present to hold a few hours' conference, I have no doubt it can be arranged for. Possibly the Scientific or Educational Section may be sufficiently interested to offer and fix the time for such conference.

STATE ASSOCIATIONS.

The American Pharmaceutical Association has no better "feeder" to draw from than the state associations, and it is a personal satisfaction to note the loyalty of our members to this branch of our work. If any have failed to appreciate the service rendered and the possibilities, I would suggest the careful reading of the several state Proceedings. Time forbids the allusion to more than one, and that one the Pennsylvania Pharmaceutical Association. I refer particularly to their Proceedings of 1895, sent me by one of its members. I make brief quotations:

Professor Remington, discussing associations and organizations, said, "There is a need in this country for an organization of a totally different kind. There is a need for the retail druggists to get together and form an organization, in which they will not admit the wholesaler, the professor in the college of pharmacy, or any school, or connected with an educational institution, or the proprietor of a remedy; but a retail druggists' association, pure and simple, which shall be controlled by the retail druggists of this country. There is a need for it."

The writer of a paper uses these words, "The manufacturers are the managers of the incubator where the cutter is hatched."

I cannot resist the temptation to quote briefly from a paper read by our Mr. Patton, of York. He says, "Thus the queer anomaly presented by reversing the order of therapeutics by fitting the disease to the remedy, instead of the medicine to the disease. The enterprise of the manufacturer does not stop here. We observe a tendency to eliminate the physician also, for do we not find treatment and dosage, with other information conducive to self-medication, plainly printed on their packages? A resolution, unanimously adopted by the Pennsylvania Medical Society at their last meeting, called upon the manufacturers to cease this reprehensible practice. It will cease or otherwise, according to the commercial aspect of the question from the manufacturer's point of view. Having by the aid of the physician introduced their products to the consumer, they would now instruct the latter to do without the services of the former—a case of base ingratitude. If the foregoing statement is open to question, there is no question about the present tendency on the part of the pharmacist to take care of himself. He has awakened to the fact that between the upper and nether mill-stone of the cutter and manufacturer he was being pulverized very fine. As the operation is not a pleasing one, especially to the victim, it behooved him to be up and doing, and endeavor to meet them on their own ground. Lessening business and diminishing profits cannot go on forever. The limit will be reached in extinction."

I have made these quotations simply to exhibit the feeling of unrest in 1895, not only among the pharmacists of Pennsylvania, but in every state in the Union. Is it not suggestive to this Association, that if we would grow, increase our usefulness, elevate and improve the practice of pharmacy, we must give the commercial side attention, and at the earliest date possible take definite and decided action? I cannot agree with the suggestion that a purely commercial association is desirable. Too many associations will surely weaken our efforts.

NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION.

I have no desire to anticipate the report you probably will receive from our delegates to this Association. But I do feel it a duty to call your attention to a few points gathered from the reading of the published reports of the National Wholesale Druggists' and Proprietors' Association at Richmond in October of 1897. We must not forget that the gentlemen attending the National Wholesale Druggists' and Proprietors' Association assemble for the commercial and social side mainly. Interested as many of us are in their action, we cannot help forming opinions of the intent, purpose and probable result, so far as we are affected in our commercial relations with them.

From present indications it is not probable that the National Wholesale Druggists' Association will exist many years as an independent body, but will become the controlling power of the Proprietors' Association, as nearly if not all the jobbers are now patent medicine makers.

We read in the editorial column of one of our pharmaceutical journals, published in May, 1898, "That twenty years ago there were about thirty wholesale drug houses in Philadelphia: the number has dwindled down to one-half dozen at the present time."

I made an effort to get a report from Boston, Baltimore, New York and St. Louis, but it was too much like reporting upon a continual funeral, I assume, as no one felt inclined to make a report. I should not be surprised to see "The Last American" reproduced in the last wholesale druggist.

From President Purcell's able and exhaustive address at Richmond, I make the following quotations:

Discount on Proprietary Goods.

"I ask the attention of the association to the question of increased discount on proprietary goods. We find no greater satisfaction in the sale of ten per cent. goods than we do in the sale of those which allow us 10 or 5 per cent. for cash, and I trust that some steps may be taken to induce all manufacturers to accede to this schedule of discounts where they are now allowing less. I forbear to argne this question, as it was so clearly and ably set forth in the annual report of my predecessor."

Growing Evils.

"I desire to direct your attention to the growing evil practiced by some of the manufacturers of selling to the retail trade. While this practice, in my opinion, is seriously detrimental to the business of the jobber, I fail to see where it benefits the manufacturer, as he takes the business from the jobber, and makes no greater profit for himself. The retail dealer often uses the lower price thus obtained to enable him to cut prices. This militates against the small retailers, and forces them to combine with others and order quantities through one of their number. If we continue to permit this, we shall eventually lose our entire business. Are you prepared to do this ? The issue is before you in a living shape, and we might as well recognize it. If we will assert ourselves in this matter, it will be speedily remedied, or, as Mr. Redsecker warned you in Philadelphia, 'somebody is going to get hurt.' While I am reminding you of the evils, permit me to call your attention to the practice of some chemical manufacturers who advertise patented chemicals and allow us ten per cent. profit, unless we buy a large quantity, out of all proportion to the demand, when they will graciously allow another five per cent. This is entirely wrong. Either the jobber is worthy of his profit over the expense of doing business, or he is useless. Let the jobber determine this, and not the beneficiary whose products he handles. I warn you that if this evil continues to grow, your profits will soon become a vanishing point."

Rebate Plan.

"We should guard with jealous interest the rebate plan. It has served us faithfully, and we should be careful to permit nothing to be done that will in any way jeopardize or weaken it. I regret to say that some innovations have crept in, which have spread from one market to another, and which should be stopped. While in themselves small and unimportant, they will eventually undermine the whole plan, as the crevasse does the levee."

One of the speakers, and apparently a very prominent member, says, "I do not believe that the salvation of the retail druggist is coming through us; I believe if they are going to be saved, it will have to come through their own exertions. I believe that their ability to succeed depends upon their unity and integrity of purpose."

From another page of the report I take this quotation: "I have tried twenty years to organize the few local wholesalers, but we see the idea of co-operation is dead."

I could but smile at the idea of 40,000 retailers becoming a unit, when one of their own number acknowledged a failure after twenty years of labor to unite a few local wholesalers. Gentlemen, if our delegates, or any retail pharmacist of this Association, can find sufficient encouragement to continue his supplications before the jobber or before the National Wholesale Druggists' Association, he has more faith and trust than I have.

PROPRIETORS' ASSOCIATION.

In this Association, held at Richmond and in connection with the National Wholesale Druggists' Association, there appears to have been an open, well defined and exhaustive consideration of all the facts affecting *their* interests. The Committee on Fraternal Relations, a new committee of the Proprietors' Association, says: "As far as the American Pharmaceutical Association reflects the sentiment of the trade of this country, your committee is forced to conclude that the retailers are simply waiting, hands down, for the proprietors and manufacturers to find a remedy and apply it."

Dr. R. V. Pierce read the report of the Committee on Trade Interests. It is, with a few exceptions, an admirable presentation of the facts. Mr. Thomas F. Main, of this Association, did loyal service for the retail pharmacists.

Apparently, the proprietors and manufacturers will not attempt, at present certainly, any plan by which full retail prices will be restored, and while admitting, "that proprietary preparations can be more advantageously distributed through retail druggists than through others," co-operative companies and individual efforts to sell goods which they (the proprietors) call substitutes, make a combination of difficulties impossible to correct by any plan. My conclusion, therefore, is this: that having failed to maintain the fixed retail prices of their goods until, as they submit, it is too late to do it now, I fear they will delay any remedy for the present conditions until co-operative companies, individual and local efforts to sell our own goods, will make it too late to return to early conditions, and at a not far distant day, the contest will be between the local dispensers of 40,000 pharmacies who prepare and sell their own local preparations or the co-operative ones, and those offered to the public by advertising and sold by the grocer.

It seems to me that the 40,000 or more pharmacists hold the key to the situation, and it remains with the manufacturers and proprietors to determine and act at once, otherwise the flood-gates of local preparations are likely to be fully opened. I do not feel that the details should be discussed or action taken at any general session until the Commercial Section has had the opportunity of formulating and presenting its views, and in that Section I may have something to say.

I have asked the chairmen of the several committees and delegations to bring or send written reports. I ask that such attendance, attention and interest may be shown as will encourage and not discourage such labor.

Some correspondence regarding the war tax, Bill 10,100, Trade Marks, and several other matters to which my attention has been called, have been referred to the Council or to the department to which they properly belonged. As acts of the Council or any department are entitled to the credit of results secured or efforts made, I purposely avoid comment.

The Secretary, Professor Caspari, I desire most heartily to commend for his prompt action and courteous attention to the many demands made upon him by myself and others during the year, and particularly for his efforts with the President of the Council in looking after a correction or modification of House Bill 10,100 before it was too late.

To Mr. Ebert and his associates we are indebted for prompt and effective work at the Food and Drug Congress.

Every member who has kindly made suggestions and rendered service to the Association, I desire to thank, and acknowledge appreciation of the same.

The Treasurer, Mr. Sheppard, has indeed been a faithful and zealous worker, and if I have given occasion for offense, I refer to him for my defense.

I have been requested to call your attention to the wisdom of incorporating in the United States Pharmacopœia of 1900 the elixirs, etc., of the National Formulary, making them official. The object is apparent, and should receive the careful consideration of the Committee on National Formulary, the Committee on the Revision of the United States Pharmacopœia, or the Committee on National Legislation.

Good sense, as some see it, is to-day adopted by many, even if not in perfect accord with generally accepted theories or scientific facts as proclaimed by the so-called regulars. I distinctly recall the charge often made in my own family, that I would rather die by the United States Pharmacopœia than live by the aid of other remedies. I have something of that feeling to-day, but if I have friends or customers who want eclectic, homœopathic, or approved special remedies, they get them; and side lines of this sort I claim are fully as legitimate and scientific as cameras or bicycles.

We have among our most valued members scientists, as well as laymen, who not only prepare and sell, but advise and use these remedies. Is it wise or good sense for us to continue the contest against them? It seems to me far better to be charitable, as in our modern theology.

In conclusion, I feel forced to briefly call attention to a few of the many items I have noticed and considered as President of this Association.

In the Proceedings of 1892, page 134, are these words: "I believe that the proprietors owe protection to the retail trade. What the American Pharmaceutical Association wants to ask is, When are you going to give it to us? . . . . We want protection, and mean to clamor for it until we get it. And if you do not give it, we will throw your goods out and put in our own." These words, read in the light of to-day, are very suggestive of the story of Moses and Aaron going before Pharoah (to be found in the book of Exodus if you are not familiar with it). Like the Egyptians, the proprietors seem to have hardened their hearts, and for more than six years we have clamored in vain. No straw is allowed, and more free advertising is required by a display of dummies. Is it not time for us to follow the example of the Israelities and "spoil the Egyptians?" How delightful it would be to hear our Miriam with timbrel and harp in song of victory!

To many of you, the quotation I shall make from the "Rocky Mountain Druggist," page 33, may be familiar. It is a demand, one of many, from the Atlantic to the Pacific, and is in accord with the recommendation of Professor Remington, already quoted:

"There is no national body of pharmacists which in the least represents the commercial side of pharmacy. The great American Pharmaceutical Association, as represented by those most active and numerous at its annual meetings, has repudiated the pharmacist's occupation as a means of livelihood. Pharmacy, in the opinion of these editors and emissaries of the manufacturers, is essentially a theatre for the display of their rare scientific attainments. The man who keeps a drug store and soils his palms with filthy lucre, is no longer considered a pharmacist. The country is probably too large for a successful national association of the bread-winners in pharmacy."

It is not my purpose to pose as an alarmist, but I do earnestly ask you to heed these warnings, as does the mariner when he sees a black cloud on the horizon. If you would keep and increase your membership, apply the science of sound business principles with good sense.

In the Proceedings of 1897 we find our membership decreased during the year 1896: by death, 23; resignation, 63; for non-payment of dues, 127; total, 213. Of these 127, 32 were elected prior to 1890, 78 were elected prior to 1894, 24 were elected in 1894, and this year, I am told by the Treasurer, about the same figures will have to be reported.

I cannot believe that this exhibit points only to a depreciated business or an effort at economy. It seems to me it rather indicates the business principle or largest personal value for the smallest investment. Five dollars will pay for five of the pharmaceutical journals, and from them, long before the annual proceedings are published, the papers and actions of value and interest to the average pharmacist are in hand. On page 337 of one of the leading pharmaceutical journals, under date of June 25, I read, "An extra edition will be issued September 5th next, containing a complete report of the proceedings of the forty-sixth annual meeting of the American Pharmaceutical Association, to be held in Baltimore, August 29th to September 3d, inclusive. A circulation of 20,000 being guaranteed."

This is the commercial side of professional journalism, and does it not pointedly suggest that a little more consideration of the business or commercial side would help us, and not injure our professional record?

In this connection, I have been requested by an active member to call your attention to the fact that valuable papers presented to this body are the property of this Association, and contribute to the value of our annual Proceedings, and should not be given to the public until published by the Association, and if necessary to stop the present method, have every paper copyrighted. When I suggested that such a request would be a challenge for a contest, his reply was, "Never mind that, it is surely coming."

An enthusiastic worker in our Association, for whom I have a profound respect, formerly in medical practice, quoting from a medical journal, says:

"It needs no prophetic eye to see the extinction awaiting the practicing physician, using the term in contradistinction to the hospital or dispensing physician. Surgeons, aside from professors and hospital and dispensary surgeons, are already extinct. The drag net of the ambulance, dispensary, clinic and hospital, have secured such a "corner" in surgery that no man outside of the chosen few can make a living. What has occurred in surgery is now occurring in medicine. No patient able to walk or ride to a hospital need pay a cent for medicine or treatment, and the weary and struggling outside general practitioner can go home, shut himself up with his emaciated wife and starving children, and turn on the unlighted gas." The Journal of the American Association, referring to the same subject, says, "The doctor as a private physician, working for himself, will more and more find his position disappearing. There will be general practitioners in out-of-the-way places, as there are now; there will be men of rare ability who will attract by their personality and who will remain individualistic in their work. But the great mass of town physicians may be obliged to adapt themselves to other conditions, and either become salaried employes of state and private institutions, or form mutual and co-operative hospitals and dispensaries, thereby employing themselves. Which plan or plans will soonest find adoption, the future alone will tell; but the general physician will probably not remain as he is, and sooner or later will be obliged to choose between the old and the new paths." The writer then adds, "If the prophets are true, and the physician of the future is to exist as part of the great medical institution, the pharmacist will follow suit......The pharmacist of the future who desires success, will, therefore, graduate in both medicine and pharmacy, so that he may obtain a general knowledge of medical science, and the large number of arts now connected therewith, and then select for his own practice those arts which will make him of the most use as an aid to the practitioner of the art of therapy and surgery......Another agency which is affecting both physicians and pharmacists is the great manufacturing houses. The time was that the apothecary kept himself busy compounding prescriptions and making preparations for that purpose. Now this is all changed. The manufacturing house, like the hospital, is a perfect machine in all its details." In closing the writer says, "A word to the wise is sufficient."

These brief extracts from a long article are quoted to show the effect of an enterprising manufacturing house in securing a brilliant and exceptionally gifted and fluent writer to try, if possible, to create public sentiment.

A pharmacist of large experience, rare ability, and I believe of absolute honesty of purpose, in an article, presents the most dismal picture of the present pharmacist and physician I ever read. If a young man, and about to enter either calling, reading only the first part of his paper, I should be tempted to enlist in the United States army or navy, or start for Alaska. In concluding his paper, the writer paints the pharmacist of the future as a most idealistic creation. One would think the theories of the perfectionists were to be realized and presented in the coming pharmacist. Agitation, as made by these two writers I have referred to, is of great value, but the end or result is too remote to be helpful at the present time.

I simply want all, every reader of pharmaceutical literature, to bear in mind that a great deal is paid for, as the newspaper pays for a sensational article, In the words of one writer quoted, if "the drag nets of the ambulance, dispensary, clinic and hospital, have secured such a 'corner' in surgery that no man outside of the chosen few can make a living, let us pharmacists beware of the drag net of the so-called 'model manufacturing house.'"

While I do not agree with the medical journals or physicians quoted, that the future of the average physician is a close room with the unlighted gas turned on, I think we must all agree that those physicians who are too indolent or too ignorant to write for such remedies as each case demands, and who depend upon the printed slips of specialties, tablets or triturates, are certainly approaching a suicidal condition. It is not for us to discuss the future of the physician, but when the writer adds "the pharmacist will follow suit," we protest. Pharmacy is a science, and we don't propose to abandon our scientific methods by any such unscientific, selfish and cowardly act. We have been trained, and our life depends upon faithful service for the public good; and exposing the public to the hazard of gas explosions is not for the public good.

Feebly, and as briefly as possible, I have presented a few points which seem to me to demand your careful consideration.

Fellow Members of the American Pharmaceutical Association: As sure as the sun rises in the East and gives us light, as sure as the North Star has been a guide to the mariner, so sure is it that the American Pharmaceutical Association has been and will continue to be the light and guiding star of the coming pharmacist. Because clouds sometimes obscure the light, or storms and contentions drive us from our course, are we like the clam to bury ourselves in the sand? There is a future for pharmacy; there is work for us to do at the present, and in the future as in the past. Our Colleges of Pharmacy are graduating one thousand or more every year. Lectures by mail, correspondence, and private instructions with special study are enabling Boards of Pharmacy, so far as I can judge, to register two thousand or more every year. And it is but fair to assume that the average pharmacist of the past three years is a better educated and professional pharmacist than the average pharmacist of ten years ago, hence the educational progress must be an accepted fact. I repeat, there is a future for pharmacy; and the future may be likened to the mining industry. Mines that have been profitably worked and exhausted, as supposed, have under modern skill and science been re-opened and worked more profitably than before. So pharmacy to-day in a few places is testing and experimenting on the lines of assay, analysis, microscopy and bacteriology.

As we of the past and present pass off the stage, the future will be nearer and nearer the ideal, and we of the past, as in the painting by Malbone, may linger for a moment while the light of the present falls upon us.

I feel like crying aloud, "Good Lord, deliver us from the pessimist; stir up the optimist; and as by Thy help we have made long strides and accomplished much upon the educational side, so guide and direct us in our efforts of good stewardship on the commercial side, that we may be prepared for the welcome, 'Well done, good and faithful servants.'"

There was prolonged applause at the close of the reading of the address of the President.

Upon motion of Dr. Stewart, heartily seconded by Mr. Hynson, the address was ordered received, and referred to a committee of three, to be reported on at a future session.

The motion prevailed, and the Vice President appointed on said committee Messrs. W. S. Thompson, of Washington City; S. A. D. Sheppard, of Boston; and H. M. Whelpley, of St. Louis.

The President resumed the chair.

Mr. Kennedy, Secretary of the Council, read a list of 58 names passed upon for membership. The chair announced that the list would be posted for inspection, under the rule, and asked that if there were any objections to any of the applicants, the Secretary of Council should be notified as soon as possible.

THE PRESIDENT: You will now listen to the reading of two cablegrams received by the General Secretary.

The Secretary read the following:

LONDON, *August* 29, 1898.

CHAS. CASPARI, JR., *Secretary, Lehmann's Hall, Baltimore:*

Cordial greetings from over the sea to the members of the American Pharmaceuetical Association.

HENRY S. WELLCOME,
FRED'K B. POWER.

LIVERPOOL, *August* 29, 1898.

President of the American Pharmaceutical Association:

Best wishes. SYMES.

Upon motion of Mr. Remington, seconded by Dr. Stewart, it was ordered that the good wishes and cordial greetings of the senders be received, with the thanks of the Association, and that the Secretary notify them by mail to that effect.

The Chair announced that the next order of business was the reading of the call for reports from the various committees, to be read by title only at this session and acted upon later; and the Secretary called the following committees:

Committee on Transportation.—Caswell A. Mayo, Chairman.
" " *Revision of the U. S. Pharmacopœia.*—Leo Eliel, Chairman.
" " *General Prizes.*—Frank S. Hereth, Chairman.
" " *Ebert Prize.*—Albert B. Prescott, Chairman.
" " *National Legislation.*—F. E. Stewart, Chairman.
" " *Beneficiary Features.*—C. S. N. Hallberg, Chairman.
" " *Meeting of 1900.*—Wm. C. Alpers, Chairman.
" " *Patents and Trade-Marks.*—Wm. Bodemann, Chairman.
" " *National Department of Health.*—Joseph P. Remington, Chairman.
" " *Membership (Special Auxiliary).*—H. M. Whelpley, Chairman.
" " *Weights and Measures.*—Frank G. Ryan, Chairman.
" " *Status of Pharmacists in Army and Navy and Marine Hospital Service of the U. S. (Special).*—Geo. F. Payne, Chairman.
" " *National Formulary.*—C. Lewis Diehl, Chairman.
Delegates to the National Wholesale Druggists' Association.—W. S. Thompson, Chairman.
" " " *Pure Food and Drug Congress.*—A. E. Ebert, Chairman.
" " *American Medical Association.*—W. C. Alpers, Chairman.

THE PRESIDENT: The next important matter to be considered at this session is the selection by the several States of two delegates each, to serve as a committee to nominate officers for the ensuing year.

Upon motion of Mr. Main, seconded by Dr. Whelpley, a recess of five minutes was had, in order to enable the members from the different States to confer.

The Association having reconvened, the Secretary called the roll of the States, Territories and Provinces, and the names presented were as follows:

Alabama—P. C. Candidus, J. E. Wikle.
Arkansas—W. L. Dewoody.
Connecticut—Thos. F. Main, John W. Lowe.
Delaware—H. K. Watson.
District of Columbia—W. S. Thompson.
Florida—S. P. Watson.
Georgia—Geo. F. Payne, John Ingalls.
Illinois—R. W. Diller, Geo. R. Baker.
Indiana—F. W. Meissner, Leo Eliel.
Iowa—E. M. Burns.
Kansas—L. E. Sayre.
Kentucky—J. W. Gayle, Geo. A. Newman.
Maine—H. Boynton.
Maryland—D. M. R. Culbreth and J. Webb Foster.
Massachusetts—F. H. Butler, John Larrabee.
Michigan—A. B. Lyons, Jos. Helfman.
Minnesota—Miss Josie A. Wanous.
Missouri—H. M. Whelpley, H. F. Hassebrock.
New Jersey—Chas. Holzhauer, E. A. Sayre.
New York—A. B. Huested, R. G. Eccles.
North Carolina—J. Hal. Bobbitt, John Y. MaeRae.
Ohio—John Byrne, Chas. G. Merrell.
Pennsylvania—J. P. Remington, Wm. McIntyre.
Rhode Island—Mason B. Wood.
South Carolina—H. Plenge, A. B. Carpenter.
Vermont—W. F. Root.
Virginia—T. Roberts Baker, T. Ashby Miller.
Wisconsin—Ed. Kremers.
Province of Quebec—J. E. Morrison, T. D. Reed.

The President named as delegates-at-large upon the Nominating Committee Messrs. W. J. M. Gordon, of Cinninnati, O.; Charles A. Heinitsh, of Lancaster, Pa.; William Simpson, of Raleigh, N. C.; E. H. Bartley, of Brooklyn, N. Y., and William Mittelbach, of Booneville, Mo.

The Secretary of the Council, Mr. Kennedy, read the minutes of that body:

SECOND SESSION OF THE COUNCIL—AUGUST 29, 1898.

Council convened at 9 a. m., in Lehmann's Hall, Baltimore, Md., with the following members present: Messrs. Beal, Hynson, Whitney, Sheppard, Caspari, Kennedy, Hechler, Kremers, Bartells, Diehl, Payne, Gordon, Jacobs and Dohme.

In the absence of the Chairman and Vice-Chairman, on motion, Edw. Kremers was called to the Chair.

The Committee on Membership presented the names of fifty-eight (58) applicants. On motion of G. W. Kennedy, the list of names was approved and recommended to the Association for its action.

Chas. Caspari, Jr., read the following report:

REPORT OF COMMITTEE ON GENERAL PRIZES.

CHICAGO, *August* 25, 1898.

To the Council and Members of the American Pharmaceutical Association meeting at Baltimore, August 29, 1898:

The undersigned Committee on General Prizes appointed by President Whitney at the meeting held at Lake Minnetonka, Minnesota, in 1897, recommends that the prizes for papers submitted at this meeting be awarded as follows:

First Prize—To James W. T. Knox and A. B. Prescott for their paper entitled "Caffeine Compound in Kola."

Second Prize—To Alfred R. L. Dohme and H. Engelhardt for their paper entitled "The Chemistry of Cascara Sagrada."

Third Prize—To Henry Kraemer for his paper entitled "Examination of Powdered Vegetable Drugs."

Trusting that this recommendation will meet with your approval, we are

Yours truly,
F. S. HERETH, *Chairman*,
GEO. F. PAYNE,
W. H. CHAPMAN.

On motion of S. A. D. Sheppard the report was accepted and recommendations adopted.

Charles Caspari, Jr., read the following report on the "Ebert Prize."

ANN ARBOR, *March* 3, 1898.

CHAS. CASPARI, JR., *General Secretary American Pharmaceutical Association*.

Dear Sir: I beg to report that the Committee upon the Ebert Prize unite in recommending that the prize be accorded to Prof. Virgil Coblentz for his paper upon Gelsemic Acid.

Respectfully yours,
ALBERT B. PRESCOTT, *Chairman*.

On motion of G. C. Bartells, the report was accepted and recommendation adopted.

George W. Kennedy, Secretary of Council, presented the following items of business which had come before the Council since the Lake Minnetonka meeting, 1897, and which were disposed of by correspondence:

POTTSVILLE, PA., *February* 7, 1898.

Dear Sir: Prof. John U. Lloyd asks permission of the Council to introduce some of the formulas of the National Formulary into the American Dispensatory, which he is rewriting.

Wm. S. Thompson moves that the request be granted, which is seconded by Geo. W. Kennedy.

Please send your vote to the undersigned.

Respectfully yours,
GEO. W. KENNEDY, *Secretary of Council*.

This motion was unanimously adopted.

POTTSVILLE, PA., *March* 2, 1898.

Dear Sir: It is moved by Chas. Caspari, Jr., that Dr. H. M. Whelpley be requested to procure a new design for a gold badge, similar to the last one, but embodying the change in initials adopted at the Asheville meeting, in 1894, namely, A. Ph. A., in place of A. P. A., and submit the same to the Council for acceptance at as early a date as convenient.

Seconded by S. A. D. Sheppard.

Please send your vote to the undersigned.

Yours respectfully,
GEO. W. KENNEDY, *Secretary of Council*.

Yeas.—Bartells, Beal, Caspari, Diehl, Dohme, Good, Gordon, Hechler, Hynson, Jacobs, Kennedy, Mayo, Miller, Payne, Remington, Sheppard and Thompson—17.

Nays—Kremers—1.

Not voting—Ford, Frost, Whitney—3.

The motion having received a majority of all the votes cast, was adopted.

POTTSVILLE, PA., *April* 16, 1898.

Dear Sir: Enclosed please find draft of program for our next meeting, to be held at Baltimore, from August 29th, 1898, to September 3rd, 1898, inclusive, as submitted by Chas. Caspari, Jr., General Secretary, Henry P. Hynson, Local Secretary, and George W. Kennedy, Secretary of the Council, in accordance with action of Council at the forty-fifth annual meeting, approved by the Association at the first General Session held at Lake Minnetonka, Minn., on August 24th, 1897.

Please send your vote to the undersigned.

Yours respectfully,
GEO. W. KENNEDY, *Secretary of Council*.

PROPOSED PROGRAM FOR THE FORTY-SIXTH ANNUAL MEETING.

Monday, August 29.	11 a.m.	Meeting of Council.
	3 p.m.	First General Session.
	8.30 p.m.	Reception of visiting members, delegates and ladies by local drug trade; to be followed by concert and hop.
Tuesday, August 30.	10 a.m.	Second General Session.
	4 p.m.	Carriage ride to points of interest and through Druid Hill Park.
	8 p.m.	Meeting of Commercial Section.
Wednesday, August 31.	10.30 a.m.	All day boat ride on the Chesapeake, including visit to Naval Academy and historical rooms of State House at Annapolis. Meals to be served en route.
Thursday, September 1.	10 a.m.	First Session of Scientific Section.
	3 p.m.	Second Session of Scientific Section.
	8 p.m.	Third Session of Scientific Section.
Friday, September 2.	10 a.m.	First Session of Educational and Legislative Section.
	3 p.m.	Second Session of Educational and Legislative Section.
	7 p.m.	Trolley-car ride through city and to entertainment at Electric Park.
Saturday, September 3.	10 a.m.	Third Session of Educational and Legislative Section.
	3 p.m.	Third General Session.

Yeas—Bartells, Beal, Caspari, Diehl, Dohme, Ford, Frost, Good, Hechler, Hynson, Kennedy, Kremer, Miller, Payne, Remington, Sheppard, Thompson—17.

Nays—Mayo, Whitney, Jacobs—3.

Not voting—Gordon—1.

The majority voting in the affirmative, the program was declared adopted.

POTTSVILLE, PA., *May* 25, 1898.

Dear Sir: The stock of gold badges being exhausted, it is moved by the undersigned that Dr. H. M. Whelpley be requested to have made fifty new badges at $1.75 each, the weight of the badge to be just twice that of the old badge, as suggested by Dr. Whelpley on behalf of the engraver.

CHAS. CASPARI, JR.

Seconded by S. A. D. Sheppard.

Please send your vote to the undersigned.

Respectfully, GEO. W. KENNEDY, *Secretary of Council.*

Result of vote:

Yeas—Bartells, Beal, Caspari, Diehl, Dohme, Ford, Frost, Good, Gordon, Hechler, Hynson, Jacobs, Kennedy, Mayo, Miller, Payne, Remington, Sheppard, Thompson, Whitney—20.

Nays—Kremers—1.

Not voting—0.

The motion was adopted.

POTTSVILLE, PA., *June* 30, 1898.

Dear Sir: Please send your vote on the adoption of the following budget to the undersigned.

GEO. W. KENNEDY, *Secretary of the Council.*

To the Council of the American Pharmaceutical Association:

Your Committee on Finance would lay before the Council the following Budget of Expenditures for the fiscal year 1898–99, for consideration and approval:

Salaries	$2450 00
Proceedings	2500 00
Traveling Expenses	125 00
Stenographer	125 00
Prizes	150 00
Printing and Stationery	400 00
Badges	30 00
Insurance	20 00
Journals for Reporter	50 00
Premium on Treasurer's Bond	25 00
Committee on Membership	25 00
Committee on Transportation	25 00
Section on Commercial Interests	25 00
Section on Education and Legislation	50 00
Section on Scientific Papers	50 00
Miscellaneous Expenses	125 00
* Special Committee on Research	51 82
	$6226 82

* Unexpended balances of 1896–97 appropriations.

Respectfully submitted,
CHARLES E. DOHME, *Chairman*,
J. A. MILLER,
JOSEPH P. REMINGTON.

Yeas—Bartells, Beal, Caspari, Dohme, Frost, Good, Gordon, Hechler, Hynson, Jacobs, Kennedy, Mayo, Miller, Payne, Sheppard, Thompson, Whitney—17.

Nays—Kremers—1.

Not voting—Ford, Remington, Diehl—3.

A majority having voted in the affirmative, the Budget was adopted.

POTTSVILLE, PA., *July* 26, 1898,

Dear Sir: Moved by S. A. D. Sheppard, and seconded by W. S. Thompson, that the General Secretary be authorized to have gold bars made for any past meetings for such of our members as shall order and pay for same in advance. Please send your vote to the undersigned.

Yours truly, GEO. W. KENNEDY, *Secretary of Council.*

Yeas—Bartells, Beal, Caspari, Diehl, Dohme, Ford, Frost, Good, Gordon, Hechler, Hynson, Jacobs, Kennedy, Kremers, Miller, Payne, Remington, Sheppard, Thompson and Whitney—20.

Nays—0.

Not voting—Mayo—1.

The motion having received a majority of all the votes cast, was adopted.

POTTSVILLE, PA., *August* 8, 1889.

Dear Sir: It is moved by S. A. D. Sheppard, and seconded by W. S. Thompson, that the General Secretary be directed to have thirty gold bars made for the coming meeting at Baltimore. Please send your vote to the undersigned.

Respectfully yours, GEO. W. KENNEDY, *Secretary of Council.*

This motion was unanimously adopted.

Report of the Committee on Membership was read by the Secretary, Geo. W. Kennedy, and, on motion, was referred to the Association, after being adopted.

On motion of S. A. D. Sheppard, seconded by Geo. W. Kennedy, Council recommended to the Association for election to honorary membership Dr. Frederick Hoffmann, of Germany, which was unanimously agreed to.

Wm. Martindale, of London, England, was proposed as an honorary member on motion of Charles Caspari, Jr., seconded by Chas. E. Dohme, and referred to the Association for confirmation.

Chas. Caspari, Jr., presented the report of the Committee on Publication. On motion of Geo. F. Payne, the report was received and referred to the Association.

Report of the Committee on Semi-Centennial celebration of the American Pharmaceutical Association was read by S. A. D. Sheppard, as follows:

St. Louis, Mo., *August* 15, 1898.

Mr. Wm. S. Thompson, *Chairman of Council, American Pharmaceutical Association:*

Dear Sir: Your Committee on Semi-Centennial Celebration of the American Pharmaceutical Association, which will occur in the year 1902, beg leave to submit a partial report:

1. They recommend that the meeting in 1902 be held in the city of Philadelphia, the place of first meeting, 1852.

2. That the publication of the decennial index to the volumes of Proceedings for the current decade be postponed so as to include the Proceedings for 1902.

3. That the Committee be enlarged so as to include two members residing in the city of Philadelphia. Respectfully submitted,

J. M. Good,
C. S. N. Hallberg,
S. A. D. Sheppard.

On motion of Geo. W. Kennedy, the report was received and recommendations adopted.

The chair appointed Jos. P. Remington and Adolph W. Miller, of Philadelphia, as additional members on the above committee.

Resignation of C. S. N. Hallberg as a member of the Committee on Semi-Centennial Meeting was presented.

On motion of S. A. D. Sheppard, the resignation was not accepted.

The report on financial accounts in the care of the General Secretary was presented by Chas. Caspari, Jr., and, on motion, was referred to the Association.

William Bodemann, chairman of the Special Committee on Patents and Trade Marks, presented a report through the General Secretary.

On motion of G. C. Bartells, the report was referred back to the special committee to be properly edited.

The following changes in the By-Laws were proposed and recommended to the Association:

Moved by S. A. D. Sheppard and seconded by H. M. Whitney, that the Council recommend to the Association the following amendments to the By-Laws:

Chapter IX., Article IX., in the fourth line insert, after the words "with the," the words "General Secretary and." Also, in said line, strike out the words "a member" and insert in place thereof the word "members." Also strike out the last sentence of said article and insert in place thereof the following: "The chairman of this committee shall be elected annually by the Council."

Also Chapter VI., Article V., strike out the last sentence.

The above changes were agreed to.

On motion of S. A. D. Sheppard, the dues, including 1898, of Wm. P. De Forest, of Brooklyn, N. Y., were remitted.

On motion of S. A. D. Sheppard, it was unanimously agreed to make a general rule that the Council hold regular meetings an hour in advance each morning of the meetings of the Association and its Sections.

The Chairman appointed Geo. C. Bartells and W. J. M. Gordon, a Committee on Credentials, to report direct to the Association.

On motion, Council adjourned. GEO. W. KENNEDY, *Secretary.*

THE PRESIDENT: Gentlemen, you have heard read the actions of your Council, and you have observed that they are very important. The By-Laws require that the acts of the Council, if approved, shall be sustained by a vote of the members present; or, if disapproved by a majority of the members present, its acts shall be revised so as to be acceptable to the Association. So you should settle this question.

Upon motion of Mr. Alpers, seconded by Mr. Mayo, it was ordered that the minutes of the Council be approved as read.

Mr. Kennedy, seconded by Mr. Alpers, moved that the gentlemen proposed by the Council for membership, a list of whose names was read and posted earlier in the session, be now invited to become members of the Association, so that they might take active part in the proceedings and join in the deliberations of the convention. It was so ordered.

The Chair appointed the following as a Committee upon Time and Place of Next Meeting: Messrs. Joseph P. Remington, of Philadelphia; T. Ashby Miller, of Richmond; Alfred R. L. Dohme, of Baltimore; John F. Patton, of York, Pa., and James F. Guerin, of Worcester, Mass.

The call being now made for incidental business, the Secretary read the following invitations for next year's meeting:

NIAGARA FALLS TOURIST AND CONVENTION ASSOCIATION,
BUREAU OF INFORMATION, 44 FALLS STREET,
NIAGARA FALLS, N. Y., *August* 22, 1898.

MR. CHARLES CASPARI, JR., *Secretary American Pharmaceutical Association, Baltimore, Md.:*

Dear Sir: We desire to extend to your Association an invitation to hold its next annual convention in this city. We believe that at no other place can visiting delegates combine with the business of the convention so much benefit and enjoyment, and assure you that if your members decide to favor Niagara Falls, we will do everything possible to make your visit a most enjoyable one.

It is perhaps not necessary to state in detail the very many advantages possessed by Niagara Falls as a convention city, with its location on the direct lines of travel from all directions, securing low excursion rates to and from all points. Its ample hotel accommodations and the opportunity for the enjoyment of the unequaled scenery about the Great Cataract and the Niagara River from Lake Erie to Lake Ontario; the great electrical power plants are also objects of special interest to very many.

We take pleasure in enclosing letters seconding our invitation from Hon. A. C. Hastings, Mayor of our city, and Hon. T. V. Welch, Supt. of the State Reservation.

We send you under separate cover a book giving general views and information about our city and locality which you may find interesting.

Trusting that your Association may decide to accept our invitation, we are,

Yours very truly, BARNES & BEARDSLEY, *Managers.*

MAYOR'S OFFICE, CITY OF NIAGARA FALLS, N. Y., *August* 22, 1898.

MR. CHAS. CASPARI, JR., *Secy. Am. Pharmaceutical Association, Baltimore, Md.:*

Dear Sir: I understand that there is to be held soon the annual convention of your Association, and I desire to call your attention to Niagara Falls as a place of meeting for your next Convention. I understand that you will decide at this meeting where your convention will be held next year, and would say that we have ample hotel accommodations to take care of you in good shape, at rates running from $1.50 per day to $4.00.

There is surely no place where the members and their friends could be better entertained outside of convention hours than at Niagara Falls, and I trust our city may be seriously considered by you as the place for holding your next convention.

I will be pleased to do exerything poesible to make your meeting here a successful one, and extend to your Association the freedom of the city.

Very respectfully yours, A. C. HASTINGS, *Mayor.*

NIAGARA FALLS, *August* 22, 1898.

THE NIAGARA FALLS TOURIST AND CONVENTION ASSOCIATION, *Niagara Falls, N. Y.:*

Gentlemen: You will kindly inform organizations making inquiry of you concerning Niagara Falls as a Convention City, that the Falls of Niagara and their surroundings, through the generosity of the State of New York, are now *free to all.*

The State Reservation at Niagara includes Prospect Park at the brink of the American Fall, Goat Island, Luna Island, the Three Sisters and adjacent islands between the American and Horseshoe Falls, and The Riverway, extending a mile along the rapids of the Niagara.

I shall be glad to co-operate with you in contributing to the comfort of conventions held here, and their enjoyment of the beauty of the natural scenery of Niagara.

Very respectfully yours, THOMAS V. WELCH, *Superintendent.*

PUT-IN-BAY, O., *August 17, 1898.*

Mr. Chas. Caspari, Jr., Baltimore, Md.:

Dear Sir: Under another cover I mail you one of our summer folders and enclose you an invitation for yourself and the American Pharmaceutical Association, to meet with us and at the "Giant Inn," the Hotel Victory, in 1899. We are prepared to meet your every want, and inclined to be very liberal with your Association to induce them to meet with us. We appreciate the class of people your Association is composed of, and with this in view, we will place at your *free* disposal the use of our convention hall, ballroom, committee rooms and our fine orchestra, and name to you the very low rate of $2 to $4.50 per day. We will also use every endeavor to make your stay pleasant and make you feel that you are glad you are with us; a feature we feel very proud to speak of, as the invariable return to us of every convention that has once met with us will bear us out in this promise. Being so centrally located as we are, and the easy accessibility of Put-in-Bay Island, and the many fine cities in such close proximity to us are features, too, that should be a strong inducement for your Association to select our hotel for your meeting place in 1899. If you will kindly read our folder and invitation carefully, and then be so kind as to present it to your convention, I am quite sure you will all be convinced that ours is the proper place for 1899. Thanking you for your trouble, and an early reply, I am yours truly until I can reciprocate here at the hotel.

Yours truly, T. W. MCCREARY, *G. A. and E. A.*

The Chair remarked that he had received some communications in regard to holding the next annual meeting in the City of Mexico, which Dr. Payne had in charge.

Upon motion of Mr. Kennedy, it was ordered that all these communications be turned over to the Committee on Time and Place of next meeting.

There appearing no further incidental business before the Association at this time, and the requirements of the By-Laws as to the matters to be considered at the first session having been fully complied with, upon motion of Mr. Mayo, duly seconded, the convention adjourned, to meet to-morrow morning at 10 o'clock.

SECOND SESSION—TUESDAY MORNING, AUGUST 30, 1898.

The Second General Session of the Association was called to order by President Whitney, at 10 o'clock a. m.

Upon motion, the reading of the minutes of the First Session was dispensed with.

THE PRESIDENT: I have a special request to make of the convention. If there is no objection, I will allow Mr. Charles E. Dohme to present a letter and an accompanying package that he has received from a gentleman in North Carolina.

There being no objection, Mr. Dohme came forward and said:

Gentlemen: I have received a communication from a druggist in Wilmington, North Carolina, Mr. William Niestlie, who has been kind enough to send on here some specimens of a very peculiar plant (probably known to many of you), the "Venus Fly-trap" or Dionæa muscipula. The donor has sent quite a collection of them, thinking you would be interested in them, and he wants me to give to as many of you as desire it, samples of the plant. Its marked peculiarity is in closing up on any insect that alights on the leaves. I think they can be kept alive for some time with a little earth around each plant. The collection will be placed in the Local Secretary's office, where any one desiring to get a specimen may obtain it.

Upon motion of Mr. Lowe, a unanimous vote of thanks was tendered the donor for his kindness in sending these rare plants for distribution among the members of the Association.

The Local Secretary arose to present an invitation from Messrs. Muth Brothers, Baltimore, to the members of the Association, to visit a room adjoining their establishment and inspect a collection of growing indigenous plants which they had arranged for the especial purpose.

Mr. Kennedy, Secretary, read the minutes of further proceedings of the Council:

THIRD SESSION OF THE COUNCIL—AUGUST 30, 1898.

Council convened at Lehmann's Hall, Baltimore, at 9 o'clock, with the following members present: Messrs. Sheppard, Whitney, Beal, Hynson, Caspari, Bartells, Kennedy, Mayo, Remington, Gordon, Kremers and Dohme.

On motion of S. A. D. Sheppard, Geo. C. Bartells was called to preside in the absence of the Chairman.

On motion, the reading of the minutes of the previous session of the Council was dispensed with, having already been ratified by the Association.

It was moved by H. M. Whitney and seconded by James H. Beal, that the Treasurer, with two other members of the Council to be selected by him, shall at our next annual meeting present suggestions as to our financial status. This motion was carried. The Treasurer selected Messrs. Thompson and Beal.

Fourteen (14) names were proposed for membership, which, on motion of G. W. Kennedy, were directed to take the usual course.

The report of the Committee appointed to examine the accounts of the Association was presented as follows, and on motion of J. H. Beal was accepted and adopted, and ordered to be presented to the Association:

To the Council of the American Pharmaceutical Association, meeting at Baltimore, Md., August 29, 1898:

The undersigned Committee appointed by the Council of the American Pharmaceutical Association to examine the books and accounts of the Treasurer, have performed the duties assigned them, and found them to be correct, and the disbursements to correspond with the vouchers.

Respectfully submitted,
JACOB A. MILLER,
CHARLES T. GEORGE,
EDWARD Z. GROSS.

HARRISBURG, *July* 29, 1898.

To the Council of the American Pharmaceutical Association, meeting at Baltimore, Md., August 29, 1898:

The undersigned Committee appointed by the Council of the American Pharmaceutical Association to examine the books of the General Secretary, have performed their duties, and find them to be correct, and agreeing with the books of the Treasurer.

Respectfully submitted,
JACOB A. MILLER,
CHARLES T. GEORGE,
EDWARD Z. GROSS.

HARRISBURG, *July* 29, 1898.

To the Council of the American Pharmaceutical Association, meeting at Baltimore, Md., August 29, 1898:

The undersigned Committee appointed by the Council of the American Pharmaceutical Association to examine the books and annual report of the Chairman of the Council, and the invested funds of the Association, report them to be correct, and agreeing with the books of the Treasurer.

Respectfully submitted,
JACOB A. MILLER,
CHARLES T. GEORGE,
EDWARD Z. GROSS.

HARRISBURG, *July* 29, 1898.

On motion Council adjourned.

GEO. W. KENNEDY, *Secretary.*

Upon motion of Mr. Caspari, seconded by Mr. Sheppard, the acts of the Council were approved.

Mr. Kennedy presented an additional list of fourteen names approved by the Council for membership. The list was posted for inspection, under the rule.

THE PRESIDENT: As the Committee on Nominations is not quite ready to report, the Committee on Credentials will be called on.

THE SECRETARY: The chairman of that Committee is not here, and some of the members are on the Nominating Committee; but the report has been handed to me, and I can read it for the committee.

REPORT OF COMMITTEE ON CREDENTIALS.

The Committee on Credentials, appointed by the Council, would respectfully report that they have performed the duty assigned them and find delegates accredited from fifty-one organizations, as follows:

Colleges of Pharmacy—Albany, Atlanta, Chicago, Cincinnati, Cleveland, Louisville, Maryland, Massachusetts, Montreal, National, New York, Ontario, Philadelphia, Pittsburgh and St. Louis.—15.

State Pharmaceutical Associations—Connecticut, Delaware, District of Columbia, Illinois, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Province of Quebec, Rhode Island, South Carolina, South Dakota, Texas, Vermont, Virginia and Wisconsin—27.

Alumni Associations of Colleges of Pharmacy—Philadelphia, St Louis—2.

Schools of Pharmacy—Minnesota—1.

National Associations—The Proprietary Association, Wholesale Druggists' Association—2.

Local Associations—Kings County, N.Y.; Norfolk and Portsmouth, Va., Pharmaceutical Association; St. Louis Drug Clerk Society and the German Apothecaries' Society of the City of New York—4.

GEO. C. BARTELLS,
W. J. M. GORDON.

THE PRESIDENT: Gentlemen, it is with a great deal of satisfaction that I find we have so many delegates from other bodies. You are perhaps aware that such delegates are entitled to the privileges of the floor, and also that any approved delegate has the option, without going through the Council, of becoming a member of this Association by making payment of the usual dues to the Treasurer, Mr. Sheppard or Mr. Kennedy. Should any delegate desire to be heard upon the floor, if he will kindly let me know it I shall gladly call upon him.

No one rising to speak, the Secretary said he had received several communications that he thought it would be appropriate to present at this time, and he read the following:

BALTIMORE, *August* 30, 1898.

Mr. President and Gentlemen: I had hoped to have the privilege as well as the pleasure of appearing before you at this time, not only because I have the honor of being a long-time member of this Association and one who has enjoyed its many privileges, pleasures and benefits, but on this occasion especially to perform the functions of the good office to which I was appointed. It is a message I wished to convey to you in person from a kindred organization of which I am also an accredited member, and who wish you God speed in your good work.

I deplore the necessity of my absence, but am summoned to the Coast on account of sickness in my family, therefore permit me by this medium to extend to the American Pharmaceutical Association, whilst in convention in this beautiful and historic city of Baltimore, a hearty fraternal greeting from the Proprietary Association of America.

Very truly yours, GEO. A. NEWMAN.

ALGONAC, MICH., *August* 26, 1898.

MR. CHARLES CASPARI, JR., *General Secretary American Pharmaceutical Association:*

Dear Mr. Caspari: As I find I cannot be present at the Baltimore meeting, much to my regret, I desire to send greeting to the President and the Association with confident good wishes for the prosperity of all its interests.

I have sent my paper *abstract* to Dr. Kremers, with details of whatever belongs to me. This I sent about a week ago to Madison, Wis., with mark, forward to Baltimore. Will you please present for me the report of the Committee on Ebert Prize. With kind regards to any who may inquire,

Sincerely, ALBERT B. PRESCOTT.

PRESIDENT HENRY M. WHITNEY, *American Pharmaceutical Association:*

Sir: We desire to call the attention of the members of the American Pharmaceutical Association, through you, its President, to the successful effort of the Association, and especially to that of its committee on the status of pharmacists in the government service, to elevate the profession of pharmacy.

While all the features anent the bill supported by the Association were not adopted. the President of the United States has signed a measure calling for the promotion of twenty-five (25) pharmacists to the grade of Warrant Officer in the Navy; this is a long step in advance, providing more adequate remuneration and status for long and faithful service, and will no doubt be extended in number as the exigencies of the service demand.

The heartiest of thanks are due, and are hereby extended to the Association for its able and hearty support, and to the committee having this work in charge for their great labor.

Probably no one outside of the able and efficient chairman of the committee referred to above, unless he be experienced in congressional legislation, can fully appreciate the many trying situations developed in conducting a measure of this kind over an extended period of several years, and the Association and the service are under great indebtedness to his untiring energy.

Respectfully submitted,

W. H. HUNTINGTON,
JOHN W. WOOD,
CHAS. E. REYNOLDS,
JOHN COWAN,
JOSEPH H. GRAHAM,
E. T. MORSE.

Mr. Gordon, of the Nominating Committee, read the report of that committee, applause greeting each name as announced.

REPORT OF THE NOMINATING COMMITTEE.

Your Committee on Nomination beg leave to report that after due consideration they present the following names to this Association for election as officers and members of Council for the ensuing year:

President—Charles E. Dohme, Baltimore, Md.

First Vice-President—George F. Payne, Atlanta, Ga.

Second Vice-President—James H. Beal, Scio, O.

Third Vice-President—Miss Josie A. Wanous, Minneapolis, Minn.

Treasurer—Samuel A. D. Sheppard, Boston, Mass.

General Secretary—Chas. Caspari, Jr., Baltimore, Md.

Reporter on the Progress of Pharmacy—C. Lewis Diehl, Louisville, Ky.

Members of Council—Wm. S. Thompson, Washington, D. C.; Henry M. Whitney, North Andover, Mass.; Chas A. Rapelye, Hartford, Conn.

These are to fill vacancies occurring at this meeting. On the election of Messrs. Dohme and Payne, two more vacancies will occur in the membership of the Council, and the committee while in session nominated conditionally John Ingalls, of Macon, Ga., and Thos. F. Main, of New York City, to fill these vacancies.

WM. J. M. GORDON, *Chairman.*

THE PRESIDENT: Gentlemen, you have heard the report of your Nominating Committee. Shall the report be received?

MR. FELL: I move, Mr. President, that the report be received, and that the Secretary be directed to cast an affirmative ballot electing Mr. Charles E. Dohme as President of of this Association for the coming year.

The motion was seconded and carried unanimously.

The Secretary announced that he had performed the duty assigned to him, and had cast an affirmative ballot for Mr. Charles E. Dohme as President of this Association, whereupon the President declared the nominee duly elected. (Great applause.)

Upon motion of Mr. Kennedy, the Secretary was authorized and directed to cast an affirmative ballot electing the balance of the gentlemen named in the Committee's report to the various offices named. The Secretary reported that he had cast the ballot as directed, except as to himself, and requested that some one else be selected to do that.

The President announced that, owing to the extreme modesty of the Secretary, or egotism, he didn't know which (laughter), some one else would have to be named for that duty; and upon motion of Mr. Alpers, the Secretary of the Council, Mr. Kennedy, was designated, and duly reported that he had cast an affirmative ballot for Mr. Chas. Caspari, Jr., for the office of General Secretary.

THE. PRESIDENT: The Committee having recommended the names of Messrs. John Ingalls, of Macon, Ga., and Thomas F. Main, of New York, to fill the vacancies in the Council which have now occurred, action thereon will be in order.

Upon motion, these gentlemen were duly elected by the Secretary casting an affirmative ballot.

The President then declared all the persons recommended by the Nominating Committee duly elected to office, and announced that the reading of reports from the Standing Committees would next be in order. There being some delay, he asked the Treasurer to read his annual report, which he did as follows:

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1897, TO JULY 1, 1898.

RECEIPTS.

Cash on hand, July 1, 1897	$2,571 69
Received from the sale of 7 Certificates @ $5.00	35 00
Received from the sale of 10 Certificates @ $7.50	75 00
Received from the sale of Proceedings	145 67
Received from the sale of Proceedings International Pharm. Congress	38 50
Received from the sale of Badges and Bars	68 70
Received from the sale of National Formulary	598 74
Received from Interest on Deposit in New England Trust Company, Boston.	60 46
Received from Interest on Money Invested in Bonds (General Fund)	136 83
Received from the Ebert Fund	28 00

Received from Annual Fees, 1893	$5 00	
Received from Annual Fees, 1894	85 00	
Received from Annual Fees, 1895	265 00	
Received from Annual Fees, 1896	430 00	
Received from Annual Fees, 1897	3,105 00	
Received from Annual Fees, 1898	1,740 00	
		$5,630 00
Received from Life Membership Fees, viz.:		
Charles E. Coombs	$75 00	
Clayton W. Holmes	30 00	
		105 00
Received from Entertainment Committee of 1897, meeting at Lake Minnetonka, Minn.		42 06
Total		$9,535 65

DISBURSEMENTS.

1897.				
July	27.	Check 632. John S. Bridges & Co., Printing and Stationery.		$18 25
	27.	Check 633. George W. Kennedy, second half year's salary as Secretary of Council, 1896 to 1897	$25 00	
		Second half year's salary as Secretary of Committee on Membership, 1896 to 1897	75 00	
				100 00
	27.	Check 634. S. A. D. Sheppard, second half year's salary as Treasurer, 1896 to 1897		375 00
	27.	Check 635. Charles Caspari, Jr., second half year's salary as General Secretary, 1896 to 1897		375 00
August	2.	Check 636. Evening Chronicle, Printing and Stationery		15 50
	9.	Check 637. Wickersham Printing Company, Proceedings	$17 87	
		National Formulary	3 80	
				21 67
	9.	Check 638. John S. Bridges & Co., Printing and Stationery.		24 70
	14.	Check 639. R. R. Donnelly & Sons Co., International Pharmaceutical Congress		304 60
	14.	Check 640. Berlitz School of Languages, Chicago, International Pharmaceutical Congress		8 25
	14.	Check 641. Oscar Oldberg, International Pharmaceutical Congress		15 00
	27.	Check 642. The Williams Printing Company, Committee on Transportation		8 45
	27.	Check 643. Caswell A. Mayo, Committee on Transportation.		11 00
	27.	Check 644. St. Louis Engraving Company, Badges		30 60
	27.	Check 645. R. J. Smith, Section on Education and Legislation		5 85
	27.	Check 646. H. M. Whelpley, Committee on Transportation	$3 75	
		Committee on Membership	1 25	
				5 00
	27.	Check 647. C. S. N. Hallberg, Section on Education and Legislation		10 60

September	20.	Check 648. J. H. Beal, Section on Education and Legislation		$11 36
	20.	Check 649. Charles Caspari, Jr., National Formulary	76	
		Miscellaneous	$30 69	
				31 45
	20.	Check 650. Charles Caspari, Jr., Traveling Expenses		72 34
	20.	Check 651. Wickersham Printing Company, Section on Education and Legislation	$8 93	
		Section on Scientific Papers	8 92	
				17 85
	20.	Check 652. W. O. Richtman and Edward Kremers, Third General Prize		25 00
	20.	Check 653. Samuel P. Sadtler, Second General Prize		50 00
	20.	Check 654. James W. T. Knox and Albert B. Prescott, First General Prize.	$75 00	
		Ebert Prize	28 00	
				103 00
	22.	Check 655. Edward Shumpik, Miscellaneous		18 00
	22.	Check 656. S. A. D. Sheppard, Traveling Expenses		76 15
	28.	Check 657. Munson Shorthand Institute, Services of Stenographer		125 00
October	7.	Check 658. Wickersham Printing Company, Proceedings.	$43 79	
		National Formulary	39 05	
		Printing and Stationery	3 25	
		Section on Scientific Papers	4 20	
				90 29
	12.	Check 659. Evening Chronicle, Printing and Stationery		3 50
	15.	Check 660. William S. Thompson, Miscellaneous		5 00
	26.	Check 661. Treasurer Strafford Savings Bank, Life Membership Fund	$75 00	
		(See below, Charles E. Coombs.)		
November	4.	Check 662. The Alpha Photo-Engraving Company, Proceedings		29 25
	4.	Check 663. John S. Bridges & Co., Printing and Stationery	$18 55	
		Section on Scientific Papers	3 20	
		Section on Education and Legislation	4 80	
		Section on Commercial Interests	4 41	
				30 96
	6.	Check 664. F. W. Barry, Beale & Co., Printing and Stationery		45 35
December	8.	Check 665. John S. Bridges & Co., Printing and Stationery.		24 00
	11.	Check 666. C. Lewis Diehl, Second half year's Salary as Reporter on Progress of Pharmacy, 1896 to 1897		375 00
	11.	Check 667. Charles Caspari, Jr., Proceedings	$9 66	
		National Formulary	63	
		Insurance	10 00	
		Printing and Stationery	3 50	
		Miscellaneous	8 09	
				31 88

December	22.	Check 668. John S. Bridges & Co., Printing and Stationery	$3 80	
		Committee on Status of Pharmacists in United States Army and Navy	6 24	
				10 04
	22.	Check 669. Wickersham Printing Company, Proceedings	$4 00	
		Section on Education and Legislation	3 00	
		Section on Scientific Papers	7 50	
				14 50
1898.				
January	5.	Check 670. S. A. D. Sheppard, First half year's Salary as Treasurer, 1897 to 1898		375 00
	5.	Check 671. George W. Kennedy, First half year's Salary as Secretary of Council, 1897 to 1898	$25 00	
		First half year's Salary as Secretary of Committee on Membership, 1897 to 1898	75 00	
				100 00
	5.	Check 672. Charles Caspari, Jr., First half year's Salary as General Secretary, 1897 to 1898		375 00
	27.	Check 673. Wickersham Printing Company, National Formulary		33 00
	27.	Check 674. John S. Bridges & Co., Section on Commercial Interests		4 89
February	16.	Check 675. Wickersham Printing Company, Proceedings	$12 56	
		National Formulary	7 40	
				19 96
	16.	Check 676. Charles Caspari, Jr., Journals	$43 00	
		Proceedings	3 50	
		National Formulary	62	
		Miscellaneous	1 59	
				48 71
March	8.	Check 677. American Surety Company of New York, Premium on Treasurer's Bond		25 00
	8.	Check 678. S. A. D. Sheppard & Co., Miscellaneous		31 61
	8.	Check 679. John S. Bridges & Co., Section on Education and Legislation		4 45
	15.	Check 680. C. Lewis Diehl, First half year's salary as Reporter on Progress of Pharmacy, 1897 to 1898		375 00
	15.	Check 681. Wickersham Printing Company, Proceedings		2,072 93
April	11.	Check 682. Wickersham Printing Company, Proceedings	$31 27	
		National Formulary	4 00	
		Miscellaneous	6 00	
				41 27
	11.	Check 683. F. W. Barry, Beale & Co., Printing and Stationery		45 35
	11.	Check 684. John S. Bridges & Co., Printing and Stationery	$3 00	
		Section on Commercial Interests	2 76	
				5 76

May	9.	Check 685. Evening Chronicle, Printing and Stationery		12 50
	9.	Check 686. George F. Payne, Committee on Status of Pharmacists in United States Army and Navy		109 55
	10.	Check 687. American Druggist Publishing Company, Proceedings		3 25
June	18.	Check 688. Wickersham Printing Company, Insurance		5 50
	20.	Check 689. John S. Bridges & Co., Printing and Stationery.		15 24
	20.	Check 690. Wickersham Printing Company, Proceedings	$7 28	
		National Formulary	2 00	
				9 28
				$6,232 64
1897.				
September	11.	Life Membership Fund, Charles E. Coombs	$75 00	
1898.				
April	4.	" " " Clay W. Holmes	30 00	
				105 00
				$6,337 64

SUMMARY OF DISBURSEMENTS.

July 1, 1897, to July 1, 1898.

Proceedings	$2,235 36
Stenographer	125 00
Journals for the Reporter on the Progress of Pharmacy	43 00
Salaries, Second Half of the Year 1896 to 1897	1,225 00
Salaries, First Half of the Year 1897 to 1898	1,225 00
Premium on Treasurer's Bond	25 00
Traveling Expenses	148 49
Section on Scientific Papers	23 82
Section on Education and Legislation	48 99
Section on Commercial Interests	12 06
Committee on Transportation	23 20
Committee on Membership	1 25
International Pharmaceutical Congress	327 85
Special Committee on the Status of Pharmacists in the Army and Navy of the United States	115 79
Printing and Stationery	236 49
Insurance	15 50
Badges	30 60
General Prizes	150 00
Ebert Prize	28 00
Miscellaneous Expenses	100 98
National Formulary	91 26
Amount paid for current expenses and National Formulary	$6,232 64
Life Membership Fund	105 00
Total amount of Disbursements	$6,337 64
Cash on hand July 1, 1898	3,198 01
Total	$9,535 65

APPROPRIATION AND EXPENDITURES UNDER SAME FOR THE FISCAL YEAR JULY 1, 1897, TO JULY 1, 1898.

	Appropriation.	Expenditure.
Proceedings	$2,500 00	$2,235 36
Stenographer	125 00	125 00
Journals for Reporter on Progress of Pharmacy	50 00	43 00
Salaries	2,450 00	2,450 00
Premium on Treasurer's Bond	25 00	25 00
Traveling Expenses	200 00	148 49
Section on Scientific Papers	50 00	23 82
Section on Education and Legislation	50 00	48 99
Section on Commercial Interests	25 00	12 06
Committee on Transportation	25 00	23 20
Committee on Membership	25 00	1 25
International Pharmaceutical Congress	340 00	327 85
Special Research Committee of Scientific Section	51 82	
Special Committee on the Status of Pharmacists in the Army and Navy of the United States	115 79	115 79
Printing and Stationery	450 00	236 49
Insurance	20 00	15 50
Badges	30 00	30 60
General Prizes	150 00	150 00
Miscellaneous Expenses	125 00	100 98
Unexpended Balance		694 23
	$6,807 61	$6,807 61

PROSPECTIVE ASSETS.

Not counting what is due from members whose names will probably be dropped from the roll at the next annual meeting, and also from members whose residence is unknown, there is now outstanding on the books of the Association:

Annual Dues for 1897	$630 00
Annual Dues for 1898	3,795 00
	$4,425 00

Respectfully submitted,
S. A. D. SHEPPARD,
Treasurer.

Boston, Mass., July 1, 1898.

THE TREASURER: I would also like to call the attention of the members to a list of payments, which is published in the Proceedings every year. It requires a great deal of labor on the part of the Treasurer, but I think it is one of the most valuable things he does, for every member can thereby audit his own account. I wish the members would look over that list, and make any suggestions as to error. There is in every volume of Proceedings a statement of every individual payment, so that every man can see that the Treasurer has made a proper entry on his account.

DR. STEWART: I move to accept the report and let it take the usual course.

The motion was seconded and prevailed.

THE PRESIDENT: The report of the General Secretary is now in order.

THE SECRETARY: The report of the Secretary at the annual meetings is usually con fined to a report on the financial accounts in the hands of the Secretary, the other business being reported by the various committees, the Council, the Committee on Publication, etc. I will read the report:

REPORT OF FINANCIAL ACCOUNTS IN THE CARE OF THE GENERAL SECRETARY.

A. RECEIPTS AND EXPENDITURES ON ACCOUNT OF NATIONAL FORMULARY, FROM JULY 1, 1897, TO JUNE 30, 1898.

I. Receipts.

From Sales and Payment of Bills due July 1, 1897		$598 74

II. Expenses.

Binding 625 copies in cloth @ 11 cts.	$68 75	
Binding 10 copies in cloth, interleaved, @ 18 cts.	1 80	
Expressage and Postage	20 71	
		91 26

III. Remittances.

To Treasurer, as per Treasurer's Receipts		598 74

IV. Sales.

To Dealers and Individuals. as per Ledger Accounts		614 17

V. Accounts Unpaid.

By Dealers		72 03

VI. Bills Due by the Association.

All bills due to date have been paid.

VII. Stock on Hand.

Copies in flat sheets	394	
" cloth	9	
" " interleaved	11	
" sheep	12	
" " interleaved	26	
		452

B. SUMMARY OF TOTAL RECEIPTS AND EXPENSES ON ACCOUNT OF NATIONAL FORMULARY SINCE 1888.

Receipts to June 30, 1898 (see Proc., Vol. 45, p. 51	$10,079 99	
Receipts from July 1, 1897, to June 30, 1898	598 74	
		$10,678 73
Expenses to June 30, 1897 (see Proc., Vol. 45, p. 51)	$6,245 37	
Receipts from July 1, 1897, to June 30, 1898	91 26	
		6,336 63

C. SALE OF PROCEEDINGS.

From July 1, 1897, to June 30, 1898	$145 67	
Remitted to Treasurer, as per receipts		145 67

D. ACCOUNT OF BADGES AND BARS.

July 1, 1897. On hand, as per Secretary's Report—Badges		23
Bars	87	
August, 1897. Received at Lake Minnetonka	51	
		138
Badges sold from July 1, 1897, to June 30, 1898, 23@$2.00	$46 00	
Bars sold from July 1, 1897, to June 30, 1898, 37@60 cts.	22 20	
" " " 1@50 cts.	50	
Remitted to Treasurer, as per receipts		$68 70
Balance on hand June 30, 1898, Badges		None.
Bars (excluding 15 old bars condemned)		85
Total receipts from sale of Badges and Bars to June 30, 1897	$577 30	
Receipts from sale of Badges and Bars from July 1, 1897, to June 30, 1898	68 70	
		$586 00
Total cost of Badges and Bars to June 30, 1897 (see Proc., Vol. 45, p. 51)	$514 40	
Cost of 51 Bars for Lake Minnetonka meeting	30 60	
		$545 00

CHAS. CASPARI, JR., *General Secretary.*

Baltimore, July 1, 1898.

THE PRESIDENT: If there are no objections, the report of the Secretary will be received and take the usual course. There being no objection, that will be the order. We will return now to the reports of the Standing Committees. I will call on Mr. Kennedy, who is, I believe, the Secretary of the Committee on Membership, to give us that report.

Mr. Kennedy read the report as follows:

REPORT OF COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

Gentlemen: In compliance with requirements of our Association, as Secretary of the Committee on Membership I herewith submit my twenty-fourth annual report:

Shortly after adjournment of the forty-fifth annual meeting, held at Lake Minnetonka, Minn., last year (1897), your Secretary attended to the duties of his office promptly, by sending the customary invitation to each applicant who was invited by the Association, to complete his membership by signing the regular blank form of completion of membership which was mailed at the same time. One hundred and thirty-seven gentlemen were proposed as proper persons to become members of our Association, in accordance with the By-Laws. Of this number, one hundred and nineteen, or eighty-seven per cent. of those recommended and invited to complete their membership, have complied, and their names have been placed on the roll of membership. The proportion of those who were recommended and invited to become members, and who subsequently completed their membership, is seven per cent. larger this year than last, and is larger than any previous year. This would indicate that members are more careful as to the class of pharmacists they propose. The new members represent nearly all sections of our country. They are credited to twenty-eight States, the District of Columbia, Canada and East Africa.

The Treasurer, S. A. D. Sheppard, on July 1, 1898, reported to your Secretary that there were 152 members liable to be dropped from the roll, for non-payment of dues. The number is very large, but considerably smaller than last year, when I reported 241. As the depressed condition in financial matters still continues, and the small profits realized by pharmacists have not improved much if any during the past year, this would account in a large measure for the number of delinquents. However, at this writing business matters look brighter, and no doubt the incoming year will be more prosperous, and consequently more satisfactory. The special Auxiliary Committee appointed by our President, and the regular standing Committee on Membership, have been at work since our last annual meeting procuring new members. The result of their labors will be reported later on; but the prospects are decidedly encouraging, and judging from the number of names received, we shall have a good increase.

Report of Membership.

Active or contributing members in good standing at last report	1,394	
Members elected since last report	119	
Total		1,513

Loss in Membership (active).

By resignation	63	
By transfer to life membership	2	
By death	15	
Dropped from the roll for various causes	127	
Total loss		207
Number on the roll at this report		1,306

Life Membership.

Number on the roll at last report	102	
Number added since last report	2	
Total	104	

Loss in Life Membership.

By death	6	
Number on the roll at this report		98

Honorary Membership.

Number on the roll at last report	13	
No additions		
Loss by death	2	
On the roll at this report		11

Total Membership.

Active or contributing members	1,306
Life members	98
Honorary members	11
Total	1,415

It would be gratifying to me could I but for one time close this report without casting upon it the shadow of the dark hand which beckons, and whose imperious demand none dare resist. Never do I approach this part of my work without a feeling of regret and sadness, as I recall to mind the pleasant acquaintance of those co-workers who have been snatched from our midst by the hand of death; and never, since I have had the honor of submitting to you these annual reports, has the grim reaper, for a single year, ceased to work havoc in our ranks. Surely these dispensations should make us watchful, inasmuch as we know not when the Son of Man cometh. During the past year our Association has been extremely unfortunate in the loss of its members. Among those who have been called to their final reward are found the names of Sellers, Taylor and Alexander, and, with all honor and reverence to those other departed companions, it may not be improper for me, at this time, to mention a few words in behalf of these three who have figured so prominently in our Association. And first I would call your attention to that young patriot, Walter S. Sellers, the youngest member of our Association, who, ever ready to uphold the dignity and sacred honor of our country, while serving in the capacity of apothecary on board the battleship "Maine," fell a victim to the Spanish treachery on the night of February 15th, 1898. It is not necessary for me to picture to you the scene of that dreadful catastrophe. The most horrible imaginations could not do it justice; history alone will tell. With his brave companions, shattered and torn, he sank into that watery grave to awaken in eternity. But not only have we lost our youngest member, but the hand of death, resting heavy upon us, hath seen fit also to deprive us of our oldest in the person of Alfred B. Taylor, of Philadelphia. The active interest displayed in the organization by this gentleman ranks him among the foremost apothecaries of our country. It was he who, with eleven others, met in the city of New York, in the year 1851, to discuss means by which the examination of drugs and chemicals imported could be improved upon. That little group of pharmacists, representing the New York, Massachusetts, Maryland and Philadelphia Colleges of Pharmacy, was the embryo from which evolved our Association, and the year 1852 witnessed the substantial founding of our present organization, which took place in Philadelphia in October of that year.

In 1851, Mr. Taylor was elected Secretary of the Convention, and when the Association was organized, was elected Treasurer, and served in that capacity for two years. In 1890 he was honored by being elected President. Deceased was the last of that little band which founded the American Pharmaceutical Association.

And lastly, I would bring to your notice the honored name of Maurice W. Alexander, of St. Louis. We cannot but miss the pleasant countenance of that dear old friend, who scarcely ever was absent from our annual meetings, and whose high social standing won to him the love and esteem of all. He was a man of unusual moral courage, and his sound advice will be ever fresh in our minds. The extension of the good work of our Association, for which he labored so indefatigably, should never be forgotten, but stand as a mark by way of encouragement to others to do likewise.

I herewith present the names of those who have died since last meeting, as follows:

Maurice W. Alexander, St. Louis, Mo.
Hermon W. Atwood, New York City.
Geo. W. Berrian, N. Andover, Mass.
Herbert G. Biddle, Lane, Ohio.
J. R. D. Coon, Olean, N. Y.
Dr. J. E. DeVrij, The Hague, Netherlands.
George Dragendorff, Rostock, Germany.
James E. Gibson, Little Rock, Ark.
Gilliam J. Kelley, Atlanta, Ga.
H. F. Kurfurst, Dayton, Ohio.
Eli Lilly, Indianapolis, Ind.
John J. McAfee, Mobile, Ala.
Emer J. McElwee, Mt. Pleasant, Pa.
George McLean, Orrick, Mo.
S. H. Melvin, East Oakland, Cal.
John C. Parr, Los Angeles, Cal.
James D. Paine, Rochester, N. Y.
Mitchell G. Rosengarten, Philadelphia, Pa.
Walter S. Sellers, Chambersburg, Pa.
Alfred B. Taylor, Philadelphia, Pa.
Henry Trimble, Philadelphia, Pa.
Bruno Tuma, New Orleans, La.
Aaron S. White, Mt. Holly, N. J.

Maurice W. Alexander, of St. Louis, Mo., died June 6th, of heart disease, a short time after arriving home from his store at No. 518 Olive street. The deceased was born in Philadelphia 65 years ago, and after graduating from the Philadelphia College of Pharmacy he went to St. Louis, Mo. He attached himself to the wholesale drug firm of Bacon, Hyde & Co. He remained with them about one year, and began business for himself. His store was at Fourth and Market streets. In 1878, he opened another store at Broadway and Olive streets. A fire destroyed this store, but he pluckily went on, all the while continuing the old store at Fourth and Market streets. In 1892, he bought out the Mellier Drug Co., at 518 Olive street. Mr. Alexander held many positions in various Pharmaceutical Associations of which he was an active member. He was a member of the Missouri Pharmaceutical Association, and served several years on the State Board of Pharmacy of Missouri. In 1888, at the Detroit meeting, he was elected President of our Association. In 1857, he married Miss Clara V. Lang, of St. Louis, who with four children mourn his death. Deceased became a member of our Association in 1871, at the meeting held in St. Louis, Mo.

Hermon W. Atwood, who had conducted a pharmacy at 846 Broadway, New York, for the past thirty years, died at his home, 51 West Eighty-second street, on the night of October 22d, from the effects of a stroke of paralysis received a short time before. He had a slight stroke on May 3d, but had apparently recovered. Mr. Atwood was born at Hartford, Conn., 57 years ago, and entered the drug business as a lad of 16 in that town. Later he entered the employ of Dickenson in Brooklyn, and was afterwards employed by Dr. King in New York City. Thirty years ago he engaged in business for himself at 846 Broadway, where he was conducting a store at the time of his death. Some twenty years ago he opened a summer store at Long Branch, and built up a fine business there, though the store was kept open only during the summer. Mr. Atwood took an active interest in college affairs almost from the date of his arrival in New York City, and over 17 years ago was elected a trustee of the college, serving continuously from that date until the last annual election, when he was elected Second Vice-President. Mr. Atwood was a man of most modest demeanor, and of a rather retiring disposition, but he was endowed with a strong personality and indefatigable industry, and all his great abilities were freely devoted to the advancement of the best interests of the college. For the past ten years Mr. Atwood has acted as Chairman of the Lecture Committee, the Commencement Committee, and of other standing committees of the Board of Trustees of the New York College; and has acted as Chairman of a number of Special Committees carrying out work of the greatest importance for the College. As Chairman of the Building Committee he supervised the erection of the magnificent new college building, and as Chairman of the Lecture Committee was chiefly instrumental in securing the present excellent faculty of the institution, and in laying out the present curriculum of which the College is justly proud. Deceased was a member of the New York State Pharmaceutical Association. In 1868, he was married to Miss Josephine Chamberlain, of New York, who died six years since, leaving three unmarried daughters, who survive him. Mr. Atwood was highly respected as a citizen, and loved by all who knew him. He became a member of our Association at the meeting held in Richmond, Va., in 1873.

George W. Berrian, of North Andover, Mass, was born in the city of New York, October 22, 1825. He received his early education in private schools in Tarrytown and Saybrook; entering the college of pharmacy of the City of New York, he graduated and received his diploma from that institution in 1855. He also pursued a course of medical study at the New York Medical College. In 1855 he was married to Ruth E. Weed, of North Andover; the same year he went into business as an apothecary, opening a store on Sixth avenue, New York. Retiring from business in 1860, he took up his residence in North Andover, Mass. Finding the New England climate unfavorable to his health, he spent his winters in the south, latterly in Florida. Stopping for a few days in Washington, D. C., on his way home from Florida, he was taken sick with pneumonia, attended with heart failure, of which he died July 4, 1898. Mr. Berrian was a man of most admirable qualities of mind and heart. A lover of good reading, he accumulated a large library made up of best books in general literature, history, science, and religion. He knew well the contents of the books that were on his shelves, and loved to have his friends, who were many, share his enjoyment with him. All who knew him will treasure his memory as a true friend, a good citizen, a pure and upright man. Deceased was a life member of our Association, and became a member in 1857, at Philadelphia, Pa.

Herbert G. Biddle, of Lane, Ohio, was born May 28, 1863, and died October 7, 1896, and was, therefore, at the time of his death, in his thirty-third year. He began the study of pharmacy as a clerk for Mr. W. H. Flood, on Woodland Ave., Cleveland, when but twelve years old. After serving a full apprenticeship, and being thoroughly equipped in the profession of his choice, at the age of twenty-one he bought the store of Joseph Lace and James Forrest, doing business at 2358 Broadway, Cleveland, and conducted that business successfully until January, 1894, when failing health compelled him to sell out. From that time on he was very miserable, and at the last was confined to his bed for four months. He was always very active in all societies of which he was a member. He took considerable interest in the success of the Ohio Pharmaceutical Association. For several years he was secretary of the School Board of Cleveland, and very much interested in its work and progress. Deceased became a member of our Association in 1888, at the meeting held in Detroit, Mich.

Dr. James V. D. Coon, of Olean, N. Y., died at his home, October 22, 1897, at the age of 63, after an illness of over two months. Deceased commenced the practice of medicine in 1856, and six years later entered the drug business, in which he has since been engaged. Having accumulated a moderate fortune as a result of successful trade, he was at the time of his last illness about to retire from active business. Dr. Coon was held in particularly high esteem by his fellow citizens. He was a man of intense public spirit, and has been honored with many important and responsible offices. At the time of his death he was President of the Olean Board of Trade, and Supervisor of the city. Although for the past few years his drug store was but a small part of his business interests, he nevertheless always kept strongly in touch with the latest ethical and commercial developments in pharmacy. He was a member of the New York State Pharmaceutical Association, and united himself with our organization in 1880, at the meeting held at Saratoga Springs, New York.

Dr. J. E. DeVrij, C. I. E., whose death was announced as having occurred on July 31st, at The Hague, was the latest recipient of the Hanbury Medal. He began life as a pharmacist, and was more or less associated with pharmacy throughout his long life; but he gained distinction as an investigator in connection with the chemistry and natural history of drugs, more especially cinchona, or as the "Times" puts it somewhat strangely, "the pharmaceutical properties of quinine." (*Vide* P. J., lix. 30.) The Hanbury Medal was awarded to Dr. DeVrij in July of last year, and presented at the inaugural meeting in October last, when the worthy recipient was unfortunately unable to be present. He died after a very short illness, at the advanced age of 85 years. Deceased was elected an honorary member of our Association at the meeting held in the city of St. Louis, Mo., in 1871.

Professor Dr. George Dragendorff died at his birth-place, Rostock, Germany, on April 7th, 1898. He was born on April 20, 1836. His father was a physician and gave him all the advantages of an education that he was able. Young Dragendorff attended the public schools of Rostock, and at the age of seventeen had finished his studies in the gymnasium. Being desirous of associating himself with pharmacy, he was apprenticed to the renowned Dr. Witte. After three years' experience he was acknowledged an assistant, and in 1858 he passed the Staatsprüfung. In order to become more broadly and deeply educated, especially in chemistry, he matriculated, in about 1859, at the University of Heidelberg. He remained here until 1860, when he was called as assistant to Professor Dr. Schulze in the chemical laboratory at the University of Rostock. This he accepted, and in the following year, 1861, upon the completion of an *Arbeit* "Ueber die Einwirkung des Phosphors auf einige Kohlensäure und Borsäure Salze," he passed his examination for the degree of Doctor of Philosophy. We see that Dragendorff had established his reputation as a student and investigator, and when we know the character of the man from his subsequent life, we do not wonder that he should be called, in 1862, by the Pharmaceutical Society of St. Petersburg to become editor of the Pharmaceutische Zeitschrift für Russland, and at the same time the director of the laboratories of the Society. In the latter he performed the chemical analysis for the government, and here he laid the foundation for his standard work, "Die Gerichtlich-chemische Ermittelung von Giften," which has passed through four editions. In two years his scientific labors attracted so much attention that he was offered the chair (Ordentlicher Professor) of Pharmacy and the Directorship of the Pharmaceutical Institute in Dorpat, Russia. This he accepted, and remained here for thirty years. He proved to be in the capacity of teacher as original as he was in everything else. He was in his teachings, as in his writings, clear and logical. Students were drawn to Dorpat to be taught by him from all over the world. He lived to impart to his students what he knew, and to make of them investigators, rather than stores of facts. That he succeeded is attested by the fact that the original publications by his students, of work carried on under his direction in his laboratory at Dorpat, number at least 400. His broad educational views, his scholarly training, his natural resources and his scientific achievements, caused him to be elected by his colleagues of the Faculty Prorector of the University of Dorpat from 1883 to 1887. The sterling character of the man and his labors were not only appreciated at home but also abroad. In 1872 he was given an honorary degree of Doctor of Medicine by the University of Munich. In 1875 he was elected an honorary member of the Pharmaceutical Society of Great Britain, and in 1885 he was awarded the Hanbury Medal. In 1883 he was elected an honorary member of the Philadelphia College of Pharmacy. It is estimated that he was an honorary or corresponding member of no less than forty different scientific bodies. Notwithstanding the large number of dissertations that emanated from his laboratory, his own scientific papers and books are estimated as being not less than 115 in number. In 1894 the University of Dorpat suffered a change in its administration. Its name was changed to the Russian Jurgjew, the German scientific spirit was abandoned, and Professor Dragendorff, among others, left the University. He then returned to the home of his youth, and built in connection with his home a laboratory, where he continued his investigations and writings. Deceased was elected an honorary member of our Association in 1868, at Philadelphia, Pa.

James E. Gibson, of Little Rock, Ark., died in his native city after a long illness. He was born in Little Rock fifty-nine years ago. After receiving a good common school education, he went to Philadelphia and entered the University of Pennsylvania, and was educated for a civil engineer. Although being fully prepared in this kind of work, his mind was turned in the direction of pharmacy, and he entered the drug store of Dr. J. J. McAlmont, afterwards buying an interest in the business, and still later buying out his partner. He continued it in the same location where it was first established, corner Main and Markham streets, until he went out of business a year or two ago. He was one of the chartered members of the Arkansas Pharmaceutical Association, and always took a deep interest in all of its deliberations. As a man, he was kind and gentle towards his associates, making himself always and everywhere agreeable and companionable. His sense of honor was strong, and no man ever had a greater abhorrence of anything little or mean. Deceased was elected a member of our Association in 1887, at the meeting held in Cincinnati, Ohio.

Gilliam J. Kelley, of Atlanta, Ga., died near Carlisle, S. C., June 20, 1897. He was born near Carlisle, S. C., May 21st, 1867. He began the study of pharmacy with Dr. Parks, Greenwood, S. C.; was next in the employ of Dr. Wilkes, of Laurens, at which place he read medicine with Dr. Thos. McCoy; a few years later he went to Macon, Ga., and worked for Mr. Ingalls; after remaining with him several years, he went into business for himself, which he sold out to enter the Atlanta Medical College; in 1893 he graduated in medicine, and two years later, in 1895, he graduated in pharmacy. He practiced medicine in Atlanta up to a few months before his death, when he returned home, and one month later he died. Deceased became a member of our Association in 1894, at the meeting held in Asheville, N. C.

Henry F. Kurfurst, of Dayton, Ohio, died there after a short illness. Deceased after receiving a good education was sent to learn the drug business in a first-class establishment. Having a strong inclination to become thorough in the profession of his choice, he became a hard and close student, and in a few years was well prepared to compound and dispense prescriptions. Mr. Kurfurst is spoken of as a kind man, honorable in all his business transactions, and exceedingly conscientious as to the quality of the drugs which he dispensed. He took considerable interest in raising the standard of pharmacy, and his death was a big loss to the pharmaceutical profession. Deceased was elected a member of our Association in 1881, at the meeting held in Kansas City, Mo.

Eli Lilly, president of the well known pharmaceutical manufacturing house of Eli Lilly & Co., Indianapolis, died June 6th last after an illness of about eleven months. He was sixty years of age. He had been gradually sinking for two months past and the end was not unexpected. Col. Lilly was one of the best known men in Indianapolis. He was born in Baltimore, Md., but while he was still an infant his parents removed to Kentucky. In 1852 he went to Greencastle, Ind., where he attended De Pauw University, and at the same time worked in a printing office. He next entered a drug store at Lafayette as apprentice, and after learning the business he returned to Greencastle, where he opened a store of his own. In 1865 or 1866, he went south for the purpose of raising cotton. The venture was not a profitable one; his wife died and his own health was wrecked by fever. He returned north to Indianapolis, where his first service was in the wholesale drug establishment of H. Day & Co. He married again, and in 1869 went to Paris, Ill., where he established the drug firm of Binford & Lilly. The field was contracted, and in 1873 the firm of Johnson & Lilly, Manufacturing Chemists, was established in Indianapolis. In 1876 this partnership was dissolved and Mr. Lilly started the business with which he has since been connected. As a citizen, deceased was public spirited and did much to further the upbuilding of his adopted city and state. The organization of the Commercial Club of Indianapolis was almost wholly due to his efforts, and much of its pleasant prosperity is attributed to his untiring work. He served the organization for five years as president. He was also interested in a number of other public enterprises, was one of the incorporators and director of the University of Indianapolis, and a member of the National Wholesale Druggists' Association. His widow and one son, Joseph K., survive him. Deceased labored hard for the success of our Association; he was desirous that it should not only grow in numbers but in usefulness. He became a member at Atlanta, Ga., in 1878.

John J. McAfee, of Mobile, Alabama, died in his native city, March 3, 1898. Deceased was born in Mobile, Alabama, March 31, 1862. He received a good education in the public schools of Mobile, and at an early age began the study of medicine with Dr. W. H. Hutton, of the U. S. Marine Service, after which he attended the Mobile Medical College, and took a three years' course, including all the pharmaceutical branches taught in the institution, after which he went into business for himself at No. 252 Beauregard St., which he conducted up to the time of his death. Mr. McAfee was a man well thought of and highly respected by all those who knew him intimately. He was considered a good apothecary, and gained the confidence of the people by treating them politely and fairly. Deceased became a member of our Association in 1890, at the meeting held at Old Point Comfort, Va.

Emer J. McElwee, of Mount Pleasant, Pa., died there September 24, 1897, after a long siege of sickness. He was born in Franklin Square, Ohio, in 1845. After passing through the schools in his native town he entered the Mount Union College, from which institution he graduated with honor. He subsequently began the study of pharmacy, and entered a drug store with this object in view, and later on matriculated in the St. Louis College of Pharmacy, from which institution he graduated. He then went to Mount Pleasant, Pa., and began business for himself in the year 1877. At the time of his death he was the oldest druggist in the town, and was very much admired for his straightforward business principles, and highly appreciated as a good citizen, who had the welfare of the town at heart. He was always to be found in any movement that was for the improvement of the place. Owing to his close attention to details, he was successful in establishing a fine business. He became a member of our Association in 1888, at the meeting held in Detroit, Mich.

George McLean, M. D., of Orrick, Clay Co., Mo., died at Colorado Springs Hospital, Col., after a lingering illness, May 29, 1897, at which place he was buried. Dr. McLean was born in Rosshire, in the north of Scotland, in 1834. At the age of sixteen he decided to study medicine, and later on he graduated from colleges in Glasgow and London. In 1865 he married and settled in London, where two children were born, a daughter and a son. The daughter is now living in Missouri, the only relative remaining. Between the years 1865 and 1869 Dr. McLean graduated from the College of Midwifery, at Glasgow; was also a licentiate apothecary from an association in London. In 1869 he went to Missouri, and a few years later lost his wife and son by death. In 1896. in the great fire that consumed most of Orrick, he lost his entire stock of drugs. He then went to Cripple Creek, and settled at Goldfield. At this place he was laid up with rheumatism, and in the following winter with meningitis, from which he died. He was a life member of the Missouri Pharmaceutical Association. His life was full of good works, and his greatest aim was to be proficient in his profession; and it was his persistent efforts in this direction that broke him down physically. He became a member of our Association in 1894, at the Asheville, N. C., meeting.

Samuel H. Melvin, M. D., died at his home in Oakland, Cal. Mr. Melvin was born in Washington county, Pa., in 1829. While a boy, his parents moved to Steubenville, Ohio, and there he received a liberal education, graduating at the age of 23 at the Medical Hall Institute. He first practiced medicine, then embarked in the wholesale drug business. In 1859, he moved with his family to Springfield, Ill., where he continued in the wholesale drug business for some years, and subsequently carried on a retail establishment. During his residence of many years in Ohio and Illinois, his career was a prosperous one, he being honored by many offices of trust and confidence conferred upon him, while in his private business affairs he merited and received a bountiful proportion of reward. In the commercial panic of 1874, however, he met with such severe financial disaster as to render a fresh start necessary. He removed to California in 1875, and after one or two business ventures, he established the drug business at Oakland, which he conducted to his death. Deceased was a member of the California Board of Pharmacy. He became a member of our organization in 1889, at the meeting held in San Francisco, Cal.

Dr. John C. Parr, of Los Angeles, Cal., died November 5th, 1897. Deceased was well educated, and excellently prepared for the study of pharmacy, which he took a fancy to when quite a young boy. He served a regular apprenticeship to the drug business, and was well liked by his employer, having given him perfect satisfaction in every particular. He went into business on his own account in Los Angeles, and was quite successful, which was due principally to close attention to business, and being polite to his customers. He established a reputation for honesty, and soon gained the confidence of the whole community. He was always delighted in doing all he could in raising the standard of pharmacy. He was a life member of our Association; his membership dates back from the meeting held in the city of Baltimore, Md., in 1856, almost since our organization was founded.

James D. Paine, a life member, of Rochester, New York, died November 26, 1897, after a brief illness. His death was due to an apoplectic stroke. Mr. Paine was born in Galway, N. Y., July 26, 1832. When he was about 4 years old, his parents removed to Albion, N. Y., where he spent the greater part of his boyhood. He was educated in the old Albion Academy. On leaving Albion, he went to Rochester, and was for a few years associated with Lane and Paine in the drug business. Later he went to Chicago and established a drug business, which he disposed of in 1870. After traveling for three years, Mr. Paine returned to Rochester, and with his brother, Lemuel C., purchased the land and erected the building which is now occupied by the Paine Drug Co. Except when traveling, he has made Rochester his home ever since. While Mr. Paine was not financially interested with his brothers in the wholesale drug business, he could nearly always be found at the store, and took great interest in the business. Mr. Paine was a man of large means, and very charitable, and was always ready to help those in need, although few knew of his philanthropic acts, except those whom he helped, for he was a man of retiring disposition, and one who disliked publicity. He was of a kind, generous and genial disposition. Although he had a mind of his own, and a will that was indomitable, they were controlled by his kindly heart. Mr. Paine became a member of our Association in 1857, at the meeting held in Philadelphia, Pa.

Mitchell G. Rosengarten, a member of the firm of Rosengarten & Sons, manufacturing chemists, Philadelphia, died at his home, 1826 Spruce street, on May 9th last. Mr. Rosengarten was born in Philadelphia in September, 1829. His father, the late George D. Rosengarten, was a native of Hesse-Cassel, Germany, where he was born in 1801, and came to this country when a young man and founded the famous chemical manufacturing firm which is continued by his sons. Deceased had enjoyed excellent health up to about a month prior to his death, when he was suddenly taken ill on the street. After rallying somewhat he sustained a second stroke, from which he never recovered. Mr. Rosengarten was a graduate of the Philadelphia College of Pharmacy. After leaving college he studied chemistry under Professor Martin Boye and the late James C. Booth. After working for about five years as an apprentice in his father's establishment he entered the firm, being then twenty-six years old. At the age of forty he married Miss Emily Huntsman, of Flushing, L. I. Deceased was a life member of our Association, and his connections with us date back to the meeting in Chicago in 1869.

Walter A. Sellers was killed in the "Maine" catastrophe in the harbor of Havana, Cuba, on the night of February 15th, 1898. Mr. Sellers was born January 5, 1874, and was the son of W. H. Sellers, for many years teller of the National Bank of Chambersburg, Pa. He graduated from the Chambersburg High School in 1891, and afterward entered the drug store of Cressler & Keeler of that place. Subsequently he went to Avon, N. J., and thence to Philadelphia, where he was employed in the store of H. C. Newbold while attending the Philadelphia College of Pharmacy, from which he graduated in the spring of 1896. He stood very high in his class, and immediately after examination passed successfully the examination by the State Pharmaceutical Board and the examination for the position of apothecary in the United States Navy. He was assigned to the "Maine" in the spring of 1896, and had been connected with it for nearly two years. Deceased was very popular at his Chambersburg home; and in addition to his professional attainments was an athlete of considerable note, and was greatly interested in nautical sports, especially swimming. Of his immediate family there remain one sister, a step-mother and a half-brother and sister to mourn his loss. Mr. Sellers became a member of our Association last year (1897) at Lake Minnetonka, Minn.

Alfred B. Taylor died in Philadelphia on Monday, February 28, 1898, of Bright's disease, after a lingering illness. He was born in Philadelphia in 1824 and lived there the greater part of his life. Mr. Taylor had been many times requested by his intimate friends to jot down in outline the facts of his life, and to give some history of his personal connection with the important pharmaceutical events with which his name is associated; but his innate modesty caused him to delay the writing, so that to-day, beyond a few dates in his career, very little material remains for the biographer. The facts of his life may be stated briefly. When quite a young man, about twenty, he graduated from the Philadelphia College of Pharmacy. Being a student, he followed up this diploma with a course at the University, where he gained the degree of B. A. Then came a season of practical pharmacy in the H. C. Blair store at 800 Walnut St. 1860 found him in business for himself at Ninth and Walnut Sts., and in 1861 he opened a pharmacy at 1015 Chestnut St., where he remained for fifteen years, or until the building was torn down to make room for the present Chestnut Street Opera House. Then four or five years in a store on Eleventh above Chestnut, and his last venture in the retail business was in a store under the Continental Hotel, Chestnut below Ninth. Since 1887 Mr. Taylor had retired from active business, devoting himself to special work and in particular assisting Prof. Remington in a scientific and literary capacity. 1851 was an important year in Mr. Taylor's life. In that year twelve men met in New York City to discuss means whereby the methods of examining drugs and chemicals imported from abroad could be improved upon. That little gathering was the embryo from which evolved the American Pharmaceutical Association, and 1852 witnessed the concrete founding of our organization, which was formally organized in October of that year. Mr. Taylor had the honor of being elected the first Treasurer. In 1850, when the Pharmacopœia was placed in the hands of pharmacists, Mr. Taylor was chosen editor and secretary, and for the three revisions of 1850, 1860 and 1870, every line of the copy was written in Mr. Taylor's hand and every proof corrected with his pencil. This was a monumental but thankless task, requiring infinite patience and encyclopædic knowledge, and pharmacy in the United States will be forever indebted to Mr. Taylor for his share in this work. Mr. Taylor was engaged in every revision since, having been appointed by the Philadelphia College of Pharmacy as well as by the General Committee on Revision. The great and justly-deserved honor of election to the presidency of our Association fell to Mr. Taylor late in life, and his connection with us is too well known to need comment. For many years he was secretary of the Board of Trustees of the Philadelphia College of Pharmacy, and was made Master in Pharmacy by that college in February, 1887. He contributed to many scientific publications, among which may be mentioned the American Journal of Pharmacy, Proceedings of our Association and the publications of the American Philosophical Society. His paper on Report of Committee on Weights and Measures, published in Proceedings of our Association 1859, is one of the most profound and scholarly essays ever written on that subject. Mr. Taylor was a practical pharmacist, schooled in the manipulation of drugs and in their preparation into pharmaceuticals. He was the first pharmacist to use cacao butter in the manufacture of suppositories. To him belongs the honor of suggesting the employment of glycerin in making fl. ext. cinchona. Mr. Taylor's wife died some years ago. He is survived by one child, Jos. Y. Taylor, a well-known druggist. Deceased was a life member of our Association, having connected himself with it at the organization, in 1852.

Henry Trimble, of the Philadelphia College of Pharmacy, died at his home at St.

David's, on Wednesday, August 24, 1898. The immediate cause of his death was consumption, although he had been in poor health for some time. Henry Trimble was born 42 years ago in Chester, Pa. He graduated from Friends' Boarding School at Westtown, and soon after went to Philadelphia and entered the drug business. In 1876 he graduated from the College of Pharmacy, with which institution his life was destined to be closely linked. He was for a number of years in the retail drug business at 5th & Callowhill Streets, the firm being Warrington & Trimble. Only a year after he graduated, in April, 1877, he was elected a member of the college, and in 1884 he became a trustee, which office he held up to the time of his death. The deceased's positions as professor of analytical chemistry and as editor of the American Journal of Pharmacy, are well known to every pharmacist in the land. He was a practical chemist and thoroughly grounded in the material essentials of his art, and holding theorists and dilettante in disdain, and consequently his "Practical and Analytical Work" is found in every working laboratory. He patiently in the odd moments of his over-busy life delved into the tannin producing plants, and his work on "Tannins" is universally accepted as authority. Besides reviews he was the author of thirty-six original papers, and wrote four in conjunction with others. An intimate friend of the dead scientist thus sums up his life and work: Conscientious, honest, modest, thorough—a man who kept steadily in view but two ideals, work and duty. He was a chemist, a writer, but above and beyond all he was a teacher. Thousands of students of pharmacy and chemistry scattered in the world owe their scientific foundations to the unremitting care bestowed upon them by that great man, Henry Trimble. Every care and interest of his own was instantly brushed aside when an aspiring student asked for aid. He wears a martyr's crown to-day because he sacrificed himself to help others; and although he attained eminence in several directions, his real monument is reared unseen in the hearts and minds of others, and love is a fame which never dies. Professor Trimble was buried privately from his home. He leaves a widow and a family. He became a member of our Association in 1876, when the Association met in Philadelphia.

Bruno O. C. Tuma died at his home in New Orleans, La., in the fifty-ninth year of his age. Mr. Tuma was born in Saxony, Germany. He went to New York in 1870, passed the Board of Pharmacy, and for many years was employed by Eimer and Amend, the well-known New York druggists. In 1874, Mr. Tuma went to New Orleans, where he remained up to the time of his death. The deceased was a competent pharmacist, and took a great interest in his profession, and was highly respected and honored in the city of New Orleans. He was married, and leaves a wife and five children to mourn his death. He became a member of our organization at the meeting held in the city of New Orleans in 1891.

Aaron S. White, of Mount Holly, N. J., died September 17, 1897, from the result of an accident by being thrown out of a carriage and kicked on the head by one of the horses. Mr. White was 73 years old. The family of which he was a member lived in the neighborhood of Mt. Holly upwards of 250 years. Mr. White was engaged in the drug business at that place for nearly 50 years. He became a member of the New Jersey Pharmaceutical Association when it was organized in 1870, and in 1876 was elected First Vice-President, and in 1878 and 1879 was elected President. Deceased was very much interested in pharmaceutical matters, and was always ready and willing to help the good cause along, both by money and labor, and was never so happy as when he was successful in elevating the standard of pharmacy. Deceased was well known as a good pharmacist, conscientious in all his dealings, and very much respected by the whole community where he resided. Mr. White was a life member of our Association; his membership dates back to 1860, at the meeting held in New York City.

In considering this report, your Secretary desires to return thanks to all officers and members of the Association for valuable assistance rendered whenever called upon, which necessarily made the duties comparatively light, and much more pleasant. I would also request members to inform the undersigned when they hear of the demise of any members.

All of which is respectfully presented, GEO. W. KENNEDY,
Secretary of the Committee on Membership.

THE PRESIDENT: Gentlemen, you have heard this interesting and valuable report of the Secretary of the Committee on Membership. It seems to me if he had read it in full, we should have had the time well spent. I know from personal comments made to me, it will be of rare value and interest, and I cannot feel justified in simply passing this along in its usual course without a special vote of thanks preceding it, and I ask, therefore, that some gentleman will make that motion.

DR. STEWART: I desire to move, Mr. President, that a special vote of thanks be accorded the Secretary of the Committee on Membership. I think he deserves it.

The motion was seconded by several members at once, and unanimously prevailed.

The report of the Committee on Transportation was next called for, and Mr. Mayo, Chairman, read as follows:

REPORT OF THE COMMITTEE ON TRANSPORTATION.

BALTIMORE, *August* 29, 1898.

Mr. President and Members of the American Pharmaceutical Association:

Your Committee on Transportation have to report that the combinations between the various railways which govern the passenger traffic on the lines which are parties to the combinations continue to throw new and annoying restrictions around any concessions in fares which they make. This year our Association has been compelled to guarantee that none of the tickets sold on the certificate plan, and none of the certificates themselves, be exchanged, or in any way utilized by others than those to whom issued. We invite the especial attention of our members to this guarantee, and trust that all will carefully comply with the restrictions imposed by their signature of the certificate. We also direct especial attention to the fact that the certificates are valueless unless duly stamped by the joint agent who will be in attendance on September 2 for one day only. In view of the specially onerous duties devolving on the General Secretary this year by reason of his connection with the local committee, the certificates will be signed by the Chairman of this Committee, and should be placed in his hands as early as possible.

Respectfully, CASWELL A. MAYO, *Chairman.*

THE PRESIDENT: The Report of the Transportation Committee will take the usual course, without objection.

The next report in order is that from the Committee on Revision of the U. S. Pharmacopœia. It is customary to refer this to the Scientific Section.

Upon motion of Mr. Alpers, seconded by Dr. Stewart, it was so ordered.

THE PRESIDENT: The next report due is that from the Committee on General Prizes.

MR. SHEPPARD: That has been acted on by the Council.

THE PRESIDENT: Committee on the Ebert Prize, that has been disposed of. Committee on National Legislation, Dr. Stewart, Chairman.

DR. STEWART: The committee begs to say that the report has been put in type, so that it can be had in the hands of each member while it is being read and discussed, as last year we were criticised for not doing so. I wish to say that we have two reports, a majority and a minority report, the latter of which is very short. I also wish to say that the

Association is to be congratulated on its minority report, because it brings before the Association for the first time a question of importance. This, then, is the report of the majority:

REPORT OF THE SPECIAL COMMITTEE ON NATIONAL LEGISLATION.

Your Committee begs to report as follows: In regard to "tax-free alcohol" retail druggists and members of this Association were requested to appear before the Committee appointed by Congress to confer with the various interests affected by the proposed removal of the tax. This request made by your Committee was acceded to, and many valuable points were brought out during the conferences held by the Congressional Committee in Chicago, St. Louis, Cincinnati and New York. Representatives of this Committee attended two of these conferences and explained the position of the Association on this question.

A Pure Food and Drug Congress was held in the City of Washington, March 1 to 4, 1898. The recognition that pharmacy received in the bill presented to the United States Congress as a result was due to strenuous endeavors of your committee. Among other things, it insisted on the adoption of the U. S. Pharmacopœia and National Formulary as standards for drugs and medicines, and also suggested the employment of pharmaceutical chemists by the Agricultural Department. All of the changes in the bill suggested were adopted.

Your Committee was asked to join in a protest against the Stamp Act devised for the purpose of raising revenue to continue the war with Spain. It was charged that the bill singled out medicine as such for taxation, and was therefore unjust. A careful study of the bill convinced your Committee that this charge could not be substantiated. The object of the bill seemed to be the levying of a tax upon secret nostrums, patented medicines, and so-called "proprietaries," also upon all medicines put up in packages similar in style to secret nostrums and dispensed with directions for self-medication.

True pharmacy having nothing in common with the secret nostrum business, improperly named "the patent medicine business," your Committee did not feel justified in identifying the American Pharmaceutical Association with it in any way. It therefore took the position that nothing should be exempt from stamp duty except the official preparations of the Pharmacopœias and those of the National Formulary.

On July 30th, the Secretary of Your Committee received a letter from Dr. C. A. Crampton, Official Chemist of the Treasury Department, Office of the Commissioner of Internal Revenue, Washington, D. C., worded as follows:

> I enclose you herewith a copy of Circular No. 501, issued yesterday, from which you will see that the interpretation of the law by this office has not been so rigid as you would probably like. The pharmaceutical manufacturers have been very persistent, and there has been no one to represent the matter from your point of view except me, and I have been overruled in many of my contentions.
>
> I am very sorry your committee did not prevail with Congress in your views of the

best requirements to enforce. It would have made matters much easier for us in the execution of the law.

In regard to the resolutions from the Committee of the Pennsylvania Pharmaceutical Association, and the Minnesota State Pharmaceutical Association, which were referred to the Special Committee on National Legislation at the last annual meeting of the Association, the Committee reports as follows:

These resolutions contained a request that the American Pharmaceutical Association should frame a bill abolishing copyright or trade-mark on medicinal products. There is no such copyright or trade-mark on medicinal products as these resolutions imply. There is no law protecting monopoly in medicinal products except the patent law. For this reason the bill asked for is unnecessary.

The way in which the secret nostrum trade is endeavoring to prevent others from copying the medicinal products and preparations which they are exploiting is by registering their titles as trade-marks. Any protection secured by so doing is on account of a misunderstanding in regard to the intent of the law by those called upon to enforce it. Fortunately much has been done lately by the courts of final resort to make clear its real meaning and intent. Reference is made to the Singer Sewing Machine case decided by the United States Supreme Court in 1895, and referred to in a former report of your Committee, and to the Castoria case, the latter having been finally decided on appeal by the United States Circuit Court of Appeals, Eighth Circuit, since the last annual meeting of the Association.

The point at issue in these cases was whether the word claimed as a trade-mark is the generic name of the thing manufactured and sold, or is a mark or name used to distinguish an article as made and sold by one manufacturer from the same article as put out by other manufacturers. In each case " it was held that because the word had become descriptive of the thing it could not be appropriated as a trademark," and the conclusion was summed up in these words:

> The result, then, of the American, the English, and the French doctrine universally upheld, is this, that where, during the life of a monopoly created by a patent, a name, whether it be arbitrary or be that of the inventor, has become, by his consent, either express or tacit, the identifying and generic name of the thing patented, this name passes to the public with the cessation of the monopoly which the patent created. Where another avails himself of this public dedication to make the machine and use the generic designation, he can do so in all forms, with the fullest liberty, by affixing such name to the machines, by referring to it in advertisements and by other means, subject, however, to the condition that the name must be so used as not to deprive others of their rights or to deceive the public, and therefore that the name must be accompanied with such indications that the thing manufactured is the work of the one making it, as will unmistakably inform the public of that fact.

In this connection your Committee calls special attention to the fact that

Germany, as well as England, France and the United States, has declared that the commonly-accepted names of patented medicines, being necessarily descriptive, become the property of the public at the expiration of the patents on the products themselves, even though the same may have been fanciful names coined or invented by the introducers and registered as trade-marks.

The secret nostrum manufacturers try to derive comfort from this decision, claiming that it only applies to medicines which have been patented, and as their "patent" medicines are not "patented" medicines, therefore they are exempt. The point is not well taken, however, for the courts have decided again and again that a descriptive or generic name cannot be a trade-mark, and if the thing has only one name familiar to the public, it is evident that purchasers are forced to employ it in the generic sense.

It is not monopoly of a brand, but monopoly of the thing itself which secret nostrum manufacturers seek. Neither are they satisfied with the limited monopoly obtained by patent, but they are striving to establish a system of perpetual monopoly of secret medicines under a strained interpretation of the trade-mark law, and desire to secure higher privileges of protection than inventors of new and useful inventions can obtain by means of the patent law.

The secret nostrum business being in direct competition with physicians in treating the sick, and with pharmacists in preparing the medicine, it is apparent that in proportion to its success the public is deprived of skilled service. It was the intent of the law-makers that those who are practicing therapy and pharmacy in this illicit manner should be the ones to pay the war tax. So many scientifically prepared pharmaceuticals are put up in packages for self-medication, however, that it is often a difficult matter to draw the line between legitimate and illegitimate. If the American Medical Association and the American Pharmaceutical Association could be induced to co-operate in devising a line of open-formula household remedies, to be dispensed by all pharmacists, under labels agreed upon by the professions, and to be used for the treatment of emergencies and those minor affections in which self-medication may be practiced with comparative safety, it would do much to harmonize the interests of the two professions, and to discourage the sale of secret nostrums advertised as specifics. This new class of preparations might with propriety be exempted from stamp duty.

During the past year the American Pharmaceutical Association has been especially honored by the National Association of Manufacturers. The Chairman of the Committee on Patents of said Association invited the Chairman of your Committee on National Legislation to take part in the deliberation of said Committee on Patents. One of the most active and prominent members of that Committee is also Secretary of the National Association of Inventors and Manufacturers, and both Associations are acting in accord along similar lines. Three important and influential Associations have thus been brought into touch with a common purpose in view, viz., the proper interpretation and partial revision of the United States patent and trade-mark laws. Your Committee now reports that by the combined efforts of the three Associations referred to, aided also by other influence, the desired object is in the way of being accomplished; for the President of the United States, has recently appointed a Commission to revise the United States patent and trade-mark laws. This Commission consists of Francis Forbes, of New York, Arthur P. Greeley, of New Hampshire (Assistant Commissioner of Patents), and Peter Grosscup, of Illinois.

The time is therefore ripe for pharmacists all over the United States to act in this matter. The question of patents and trade-marks as affecting medicinal products should be brought before every national, state and local medical and pharmaceutical society for discussion, and taken up with like intent by every medical and pharmaceutical college in the United States. The sense of each organization should be made known to the Secretary of the Interior in the form of proper memorials or resolutions, and he will refer the same to the Commission. Your Committee has already called the attention of the President to the work of the American Pharmaceutical Association in this connection, and the same has been referred to the Secretary of the Interior, who in turn referred the matter to the Commission; so that another of the objects of this Association in appointing a special committee on national legislation is likely to bear fruit.

Your Committee further calls attention to the importance of a special study of the patent and trade-mark laws by the pharmaceutical profession at this critical time. Ignorance in regard to the object of these laws and their nature has proven a great impediment in the way of your Committee in conducting its work. The Committee has had the aid of some of the best legal talent in the country, including Hon. John S. Seymour (of the law firm of Seymour and Harmon), late Commissioner of Patents, Hon. Benjamin F. Butterworth, who recently died during his incumbency of the office of Commissioner, George H. Lothrop, of Detroit, Mich. (also deceased), and James B. Dill, of the well-known law firm of Dill, Seymour & Kellogg, of New York, who several years ago was associated with Frederick Betts, Dr. Charles Rice, and the chairman of your Committee, all of the same city, in the celebrated Tonga case. The services of these gentlemen were freely given to this Committee and they are hereby publicly acknowledged.

The importance of clearly defining the problem now before the Association by the appointment of the Commission above referred to is very evident. It is time to drop vague terms and loose definitions and call things by their right names. The terms "patent medicine," "proprietary medicine," "secret nostrum," "trade-mark pharmaceutical," etc., will no longer suffice. We must define clearly our premises before we can satisfactorily enter into arguments with our opponents.

In the first place, it will be admitted that pharmacy is the art of preparing medicine to meet the demands of a rational therapy. As such, it is a medical art, and the knowledge of it is a part of medical science. Pharmacy and therapy are two branches which relate to pharmacology or the science of drugs. This definition will be found correct by consulting such authorities as H. C. Wood,* Hermann † and others. Your Chairmain recently conferred with the first-named authority, who unhesitatingly confirmed this definition, although the term "Pharmacology" is so frequently used in the limited sense in reference to what may be more properly described by the term "Pharmacodynamics," or the "physiological action of drugs."

Medical science requires that every drug and chemical, and preparation of the same, shall bear a name which shall belong to and identify it, shall mean that particular thing, kind and variety of it, and mean nothing else, and that exact knowledge of the article shall be published in language sufficiently explicit to permit its duplication by those who are skilled in the art to which it belongs or is the most nearly related. It is this knowledge and intimately associated knowledge on the same subject, which, when properly classified and protected by a changeless nomenclature, constitutes the science of drugs. It is to promote progress in science and the arts that the patent law was devised, and it is unlawful to grant patents for medicinal products or preparations unless new and useful inventions, displaying a greater degree of skill than naturally to be expected from skilled physicians, pharmacists, and chemists in the practice of their respective professions; and unless the art of preparing them is fully published in the applications for patents. To those who confer a benefit on mankind by making such discoveries, and publishing full knowledge of the same for scientific and commercial purposes, the government, representing the public at large, may grant the right to prevent others from copying and dealing in their inventions as merchandise for a period of seventeen years.

The commonly understood meaning of the term "patent" medicine is "secret" medicine. The term is a misnomer when thus applied, for a thing patented is a thing divulged.

The common understanding of the term "proprietary" medicine is a medicine whose commonly accepted name is registered as a trade-mark. But, registering such name as a trademark does not make it a trade-mark, for a title which the public use to describe the article cannot at the same time perform the function of a brand-mark, to distinguish one make of the article from another make of the same article.

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* A Treatise on Therapeutics, by H. C. Wood, M. D., LL.D., Third Edition.

† Experimental Pharmacology, by L. Hermann, Prof. of Physiology in the University of Zurich.

This point is put in very clear language in a little pamphlet issused by the Castoria Company. As the same is virtually the opinion of their lawyers, who so successfully fought the case to the finish on appeal to the court of final resort, it is worthy of a place in this report.* Such names belong to the articles themselves, not to their makers, and should fall at once into the public domain and be used as appellatives, not as trade-marks. During the monopoly created by a patent, no one but the patentee has a right to make and sell the patented article, and hence the monopoly in one sense restricts the use of the name by the public for a limited time, but it does not prevent the name becoming at once a part of the common language, as a noun, to be used as the name of the article, nor interfere with its adoption by the Pharmacopœia as a title, nor hinder its free use as an appellation by writers who wish to refer to the article in text-books or other scientific literature. On the other hand, when the trade-mark name is the only name commonly known, writers are forced to specify a certain *brand* or *make* of an article when they write about it, and physicians are forced to specify the brand of individual manufacturers, or ignorantly do so when they may be opposed to the same on principle. As a trade-mark is a creature of natural right and common law, belonging to the makers of the articles in perpetuity, physicians, writers and teachers alike, wittingly or unwittingly, thus join in an advertising scheme, and give them aid in perpetuating unfair monopolies; while all literature referring to the articles by trade-mark names, including periodicals, text-books and dictionaries, become standing advertisements of monopolized articles for which the manufacturers pay nothing. In this manner the educational interests of medicine are made to that degree subservient to the nostrum trade. It is, indeed, "a trick of the trade."

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* A trade-mark is a word, symbol, mark or device which is used by a certain trader to distinguish his manufacture of a certain article from the same article as manufactured by others. And this mark must be, not something which the trader may have in his own mind as distinguishing his goods, not what he may have registered, but the mark which the public understand and use as the distinguishing mark. The very essence of a trade-mark right is the right to prevent the imposition upon the public of the goods of one trader as the goods of another; and consequently the mark can only be the one by which the public distinguish the goods, either from long association or by the advertisements of the owner of the mark.

No right can be acquired in the name which is used to designate goods. When a new article is invented and is placed upon the market for sale, a name must necessarily be given to it, otherwise the article could not be known or recognized. This name could not, under any circumstances, be a trade-mark; and if the process of manufacture is secret, or protected by a patent-grant, any person lawfully discovering the process of manufacture, in the case of a secret process, or upon the expiration of the patent-grant, may rightfully commence the manufacture and sale of the article, and would be upheld by the courts in the use of the name by which the article was known in the trade. There is no monopoly in the nature of a copyright or in the nature of a patent in the use of any name. Whatever name is used to designate goods, anybody may use that name to designate goods—always subject to this, that he must not make any false representations that his goods are the goods of some one else.

The first introducer of goods, who by right of discovery or invention is for a time the only maker, often gives to his goods a new name, or, as is more frequently expressed, a "coined" name. Very many people, even manufacturers who use them, are under the erroneous impression that the coining of a name for a new article invests its originator with proprietary rights in the word itself. This fallacy is quite general, and many manufacturers have not been slow in grasping the opportunity to foster it, thereby deterring many persons from entering into a lawful and honorable competition.

It is not the coining of a word which is productive of rights in its use, but it is the manner in which that coined word has been used in connection with the goods manufactured. If a coined word is used as the name of a new article, it is public property, and, as such, may be rightfully and lawfully used by any person who manufactures and sells that article. If the person who coined a word were to be, perforce of such coining, allowed to monopolize that word as the name of a new article, every valuable invention would be monopolized in perpetuity. No patent laws would be needed. The absurdity of this proposition is so obvious that it seems incredible that so many manufacturers have been allowed to monopolize the trade in certain goods, and stifle all competition. It is not legislation which is needed to remedy this evil, but it is litigation.

A "secret" medicine is thus defined by the official Medical Board of Saxony: "Secret remedies are all those agents sold for the prevention and cure of diseases of men and animals of which the ingredients, percentage composition and method of preparation are not made public when first announced for sale. Such information must be complete and exact, in readily comprehensible language, and made known to all desirous of such information."

Taking the above facts into consideration, it is evident that a patented medicine is neither a "patent" medicine, a "proprietary" medicine, or a "secret" medicine. The object of the patent law is to promote progress in science and the useful arts. Can it be applied to medical science and the associated arts of pharmacy, pharmaceutical chemistry, and therapy, in a manner to realize this object? Owing to the impossibility of ascertaining the true value of a new introduction to the Materia Medica as a therapeutic agent, except by years of patient investigation by competent observers, working under different circumstances, with opportunities for freely criticising each other's work, untrammeled by commercial considerations, the granting of patents for inventions in the therapeutic art does not seem practical. There may be inventions in the art of preparing medicines which are patentable, but the patent law requires that greater skill shall be displayed than naturally to be expected from skilled pharmacists and chemists, otherwise progress in the knowledge and practice of their arts will be hindered and not promoted. No one has the right to monopoly of products which show only the ordinary skill of practitioners in their respective arts. The free use of such products belongs by right to the profession, and those who seek to appropriate them unfairly have no right to characterize legitimate competition as "fraudulent substitution." Imitation of labels and trade-marks is fraud, but competing in the manufacture and sale of articles belonging by right to the profession, and selling them under their commonly accepted names, is perfectly legitimate.

If the profession, acting through the Patent Office, desires to reward inventors of new and useful inventions by granting them the right to prevent others from copying their inventions as articles of merchandise for seventeen years, that may be a right thing to do; but it is a very wrong thing for inventors, and worse yet for those who claim to be inventors when they are not, to seek to throttle competitors by legal proceedings when they are pursuing their vocation in a legitimate manner. Such competitors show proper enterprise, and should be encouraged by the profession, not condemned.

The trade-mark law should so read as to make it necessary for every article of commerce, when first introduced, to have a name given it for public use as a part of the common language. It should also require that the common descriptive name of each article advertised should appear in advertisements equally prominent with its brand-name, so that the latter may be used by the public for the purpose of specifying a particular brand when desired, and the former employed to designate the article itself as such, irrespective of who is the maker. In describing trees as to natural order, genera and species, so is it in describing medicines: every kind of tincture, fluid extract and pill must have a specific name by which it may be described, and if the introducer does not supply it he has no reasonable cause of complaint if the name claimed by him as a trade mark ceases to perform its function as a brand-mark and falls into the public domain as a descriptive word or appellative. The trade-mark law should be so revised that its ambiguous wording will not protect those who desire to create perpetual monopolies of secret medicines by claiming that their commonly accepted names are trade-marks.

The trade-mark law, thus being made protective of scientific nomenclature, might find favor with scientific men, and the patent and trade-mark laws, properly interpreted and applied, might then work in harmony for the stimulation of progress in science and the useful arts, as it was intended by those who devised them. Then the term "patent medicine" might cease to be a term of reproach, and the patent might become the highest guarantee of quality and excellence.

The Patent Office was intended to be a great bureau of archives, or a kind of reference library with specifications and models, to be used freely by the public. Full knowledge of each article patented, in language sufficiently clear to enable those skilled in the art to duplicate and experiment therewith for scientific purposes, and to improve methods of manufacture, can be obtained from the Patent Office at nominal cost. It is said that patents are sometimes secured without complying with the terms of the Patent Law. Such patents are void, for a patent is a *contract* between the inventor and the government representing the public at large, compliance with the terms of which is necessary to make it binding. It is evident that if the Patent Office be supplied with competent examiners, and sufficient facilities to thoroughly test the claims of inventors, the number of patents for medical products can be restricted to truly new and useful inventions in the meaning of the patent law. This at present is a weak point in the Patent Office. Ex-Commissioner Seymour informed your committee that the facilities at the disposal of the Patent Office are entirely inadequate for the purpose. On account of the demands made upon the present force, the average time permitted for the examination of applications according to Mr. Seymour is only one hour, when in some cases days of experiment are necessary to determine whether an alleged invention is really a patentable invention in the proper meaning of the patent law.

Here is an excellent field of work for those interested in original investigation—a work which the American Pharmaceutical Association can take up with profit. Let members of the American Pharmaceutical Association send to the Patent Office for copies of medical patents, and commence a campaign of investigation of the claims made by the patentees. In suits for infringement of patents, the publication of the results secured by such a campaign would furnish evidence of the most valuable kind. And the censorship over the entire subject of medical patents, properly exercised in this manner by the American Pharmaceutical Association, would do away with many of the abuses complained of.

Your Committee has been informed that the preamble and resolutions on the subject of patents and trade-marks, which was presented by the American Pharmaceutical Association to the American Medical Association, and which was referred back to the American Pharmaceutical Association for final action and returned after debate at the last annual meeting of the latter Association, was referred by the American Medical Association to its Section on Materia Medica, Pharmacy and Therapeutics. Said Section appointed a committee consisting of Prof. Warren B. Hill, of Milwaukee, and Dr. Robt. G. Eccles, of New York, for further consideration of the document referred to. Your Committee is now informed that these gentlemen will doubtless suggest the formation of a committee on the nomenclature of Materia Medica titles, and your Committee therefore suggests that the American Pharmaceutical Association should also appoint a committee on nomenclature to co-operate in this important work.

In closing this report your Committee would urge pharmacists to obtain the decision of Judge Brewer, of the United States Circuit Court of Appeals* in the now famous Castoria case, already referred to in the last annual report, and carefully study the principles which he has there so clearly enunciated. The pharmacist has his wrongs, but he also has his rights, and in grieving over his wrongs he should not forget to find out what his rights are, for in many cases by exercising his rights he can right his wrongs.

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* U. S. Circuit Court of Appeals, Eighth Circuit, No. 899. Dec. Term, S. D., 1897.

The reading of the report elicited considerable applause at the close.

THE PRESIDENT: Gentlemen, you have heard the very elaborate and exhaustive report of the Committee on National Legislation. What is your pleasure?

DR. STEWART: Would it not be a good idea to hear the minority report now?

Mr. Main delivered the minority report in the following words:

MINORITY REPORT OF COMMITTEE ON NATIONAL LEGISLATION.

Mr. Chairman: I find myself unable to agree with that portion of the very able report presented by the Chairman of the Special Committee on National Legislation, which relates to the trade-marking of names; his contention being that a special name coined for the purpose of marketing a preparation should at once become public property and be open to the use of all manufacturers.

To carry out such a proposition would to my mind be detrimental to the public welfare. The common law guarantees what has been termed the "sacred right" of property, and an individual who coins a name for an article of his manufacture and by hard labor and the expenditure of his means, creates a market for his product under the special name he has adopted, has created a property right in that name which the common law will protect him in.

The property right thus acquired is not in conflict with the rights of any other person, for the individual has by his own labor created property, by making valuable a name which before he put his time and labor upon it possessed no intrinsic value whatever.

The common law is supported by the common sense of the community, and that the common law right in names has been recognized by the drug trade is shown by the Castoria case, to which allusion has been made, as while it is true that on account of a conflict between the patent and trade mark laws (Castoria being a patented article), the courts decided adversely to the manufacturers of Castoria, the trade generally is of the opinion that while the decision may be law, it is not "equity," and 99 per cent. of the drug trade continue to purchase and sell the Castoria made by the original manufacturers.

To allow manufacturers generally to market their products under a special name coined by one maker for his own preparation, would be detrimental to public welfare; inasmuch as different manufacturers might market different products under the same name, and even when similar products were supplied they would be of varying grades of strength and purity, and the purchaser suffer thereby.

Believing that rights to a coined name are property rights, I am in favor of such a revision of the trade mark laws of the United States as will prevent confusion arising in the adoption and coining of names for special products and will recognize the property rights of the individual in a name, originated and used by him for the marketing of his special productions.

Respectfully submitted, THOS. F. MAIN,
Of Special Committee on National Legislation.

Mr. Eliel moved that both majority and minority reports be received and take the usual course, and the motion was put and carried.

DR. ECCLES: In listening to the minority report I was forcibly struck with the attitude of the speaker; and, while I have always considered him a clear-headed thinker, I cannot agree with his position in this matter. I don't know whether he was speaking from the standpoint of commercialism or not—or whether he was being "pinched" and was speaking from feeling, rather than judgment; but it seems to me it must be a matter of feeling, because a clear judgment of the case as I see it—and as many others see it—is against Mr. Main's attitude.

When a patent is granted, it is for a limited period of time—so as to pay that individual for what? Not for discovering the thing. Here is the mistake frequently made by the multitude—that is, that a man has made a discovery and patents it, and has got a right to it. Now note the distinction. No man ever yet made a discovery that he has patented—not in the sense commonly meant. He only adds a little bit to it. As if a man were to build an arch of a bridge, and you say to the man who puts the keystone in, "You shall have a patent, and nobody else." That is what a patent is. The man who builds the bridge gets nothing. The man who puts the keystone in gets the whole thing and monopolizes the whole business. We should carefully and absolutely limit patents to the seventeen years allowed, and forbid the privilege or monopoly being carried beyond that time by any device whatever.

Take vaseline—take antipyrine—take phenacetin. These names have become so popularized that when the average man goes to buy them he does not know the chemical name, and he doesn't care; all he knows is that it is antipyrine, say, and he wants that. At the end of seventeen years that name of antipyrine has become public property; and if you grant a man the right to continue the name, and nobody else can use it, you are simply continuing a monopoly for all future time in favor of that man, and as against the rights of the public and public policy. I believe it would be a crime to grant such a right. Now, mark what I say, I believe that it would not only be wrong in judgment and in violation of common sense to do this thing, but it would be a crime against humanity.

Here is the solution of the problem: If the vaseline people want to continue the use of that name after the expiration of the time-limit, let them put it out as "Vaseline-Chesebrough." Give them the right to add their own name to it, and thus let the public know it is their manufacture, but forbid them the monopoly of the name "vaseline."

The proper plan would be for the true chemical name to be applied to these articles, and then let the manufacturer give their particular name if they want to as a synonym, but let them be popularized by their true names. But a name given an article which has been popularized under that name and which describes it and distinguishes it, should belong to the people, and they should hold on to it in opposition to every monopoly. (Great applause.)

Mr. Helfman: Mr. President, I am very glad, indeed, that Dr. Stewart's able report has provoked such a lively and interesting discussion. It is my contention that the members of this Association ought not to leave this hall with the idea that Dr. Stewart's report is a mere academic essay. It is something more far-reaching than any academic paper. It is a matter of the greatest importance—this question presented here—and addresses itself to every druggist and manufacturer in the United States.

The gentleman who first spoke in a very modest way for the sanctity of property-rights entirely overlooked the fact that in those countries where the rights of property are most clearly respected no such thing as this is allowed. In Germany, in France, in England, the rights of property are very clearly respected; and yet what are the privileges of the manufacturers of these products which have come under discussion? They may patent the process, but they may not monopolize the name and chemical composition of the product itself. In other words, the German receives his patent on sulphonal, but he does not monopolize the name "sulphonal," nor the chemical composition of the product.

But notice the three-fold, iron-clad restrictions as to general manufacture here. The name is trade-marked; the article is patented; the composition of the article itself is monopolized. So that the American manufacturer cannot put on the market sulphonal as such, even though it be manufactured by a different process which he himself has devised. There is a three-fold monopoly. What is the result? The American product is explcited to the Queen's taste.

This is a growing evil that I think calls for action in this country, and I trust this Association will realize that this is a matter of special importance, and ought to be thoroughly sifted.

MR. ALPERS: Mr. President, I would like to add my protest against the views of the minority in this report. While I appreciate Mr. Main's usual clear manner of thinking, and know he is a man of good, sound judgment, I cannot agree with him in this particular case. The plea of sanctity of property is not tenable in this connection. A patent is a contract between the man who gets it and the people of the country where he gets it. No sound man ever makes a contract unless he receives and gives. There is no contract in which one side does all the giving and the other side only receives. Yet the owners of patents on such goods as have been mentioned always claim that they are the only ones who confer benefit on the public; they never admit that they get something in return. In executing this contract, they are givers and receivers, and the full amount of good they do in the country is offset by the amount of good derived by them from the government by way of patent.

The right to a name should expire with the patent, or the public will never derive any benefit from it. It is just and right, and is the law in all civilized countries, that the exclusive right to a name and the patent shall expire at the same time, and the name become common property. This is a plain and logical position, and some manufacturers have adopted it. The manufacturers of antipyrine, for instance, have given up the claim to the exclusive use of that name, but have reduced the price to such a figure as to defy competition. But the name "antipyrine" is now common property in this country. I believe this view of the matter is the correct one.

MR. REDSECKER: That is all right as far as the patented preparations go, but what about trade-marks?

MR. ALPERS: As far as the contract between the owner of the trade-mark and the public is concerned, there is no difference. The owner of the trade-mark receives the same benefit from the public. If he cannot make any money out of it in seventeen years he cannot afterwards, as I see it.

MR. REDSECKER: But a trade-mark does not cease at the end of seventeen years.

MR. ALPERS: But it should. There is where we have a mistake in our laws.

DR. STEWART: I would like to correct a misapprehension. This is a question of definition. A trade-mark is simply a commercial signature, just like writing your name on your product. It has nothing to do with the title. It is a great mistake to consider the generic term as a trade-mark. It is just as when a baby is born into the world—when you name the baby the name applies to the baby, and not to the man who names the baby. The generic name is not a trade-mark at all; it is simply the title—the name of the thing itself. You may use the name, but it is common property, or should be.

MR. KREMERS: Certain complications arise from a misuse of the term "trade-mark." For instance, silver acetate is something nobody could patent, and I don't suppose it would be possible to invent a process of preparation that could be patented. But a firm has been introducing that as an anticeptic, under the name of "silver acetate actol."

Now, it seems to me—whether the fault of the manufacturer or somebody else, I do not know—this term "actol" has been used as a synonym for silver acetate. Thereby the trade-mark has become the name proper, and has entered into our medical text books, and become a synonym, and cannot longer be considered a trade-mark.

Mr. Eliel: Inasmuch as there will be another report on the trade-mark question—a report by Mr. Bodemann, of Chicago—I desire to call the attention of the Association to a paragraph in this report on page 54.

The President: That report from Mr. Bodemann will be called up later on, and I think it had probably better be discussed then.

Mr. Eliel: But this is outside of that, and I think it should receive some discussion entirely aside from that report. I will read paragraphs 3 and 4 of the Committee's report:

Having read the sections named, Mr. Eliel continued as follows:

Now, Mr. President and gentlemen, as I understand it—as I was informed by one of the members of the committee on this report—the Senate bill in connection with this stamp duty had this clause in it, exempting all the preparations in the Pharmacopœia and the National Formulary. The Senate Conference Committee—the House and Senate Committe—accepted this view, and it was generally understood that preparations of the National Formulary and the Pharmacopœia were exempt from taxation. But what do we find, now, gentlemen? It is nothing of the kind. There are very few preparations which are official in the National Formulary, and very many which are recognized in the Pharmacopœia, but which we shall have to stamp. We cannot put up five cents' worth of petrolatum, or five cents' worth of cold cream, but what we shall have to put a stamp on it.

How was this change made in the law? There is something you gentlemen ought to know—why this law was changed to read as it does now. I can tell you. It was done in the interest of certain establishments, who sent circulars out to the drug trade all over the United States, asking them to petition their Senators not to do this thing—it would ruin their business, and all that. The druggists did not look into this thing. They sent their petitions to their Congressmen and Senators. The Conference Committee was overwhemed with the petitions; and they said, "The druggists don't know what they want; let us strike out the whole thing." And it was struck out, and here we are! We could have gone there and said, "These preparations are not proprietary preparations. Stamp them if you want to." Recognizing thus the National Formulary, we could have sent out an appendix to the Formulary every three months at a nominal figure, and had anything in there we wanted; and it would have put the American Pharmaceutical Association on a better footing. But where are we now?

Mr. Main: I was not talking about patented preparations, but about those preparations that had a so-called trade-mark name. I still believe the good sense of this Association, and the people at large will support the idea of a property right in a name that has been made valuable. The case of vaseline was brought up. It was a new preparation, and a thousand kinds of jelly were sold through the advertisement of vaseline. Any man has a right to put out the same article under some other name; but I believe common sense and common law will support the right of a man to a valuable name he creates.

Mr. Watson: I think Mr. Eliel's remarks more properly apply to the Commercial Section.

MR. REDSECKER: I arise to a point of order. We are not discussing the stamp act; we are discussing these preparations.

THE PRESIDENT: If there is any more discussion on this subject the Chair will rule that it must be confined to the subject of national legislation, which did not, at the time this committee was appointed, contemplate the stamp tax. It contemplated just what was before us—trade-marks and patented articles. The stamp tax was not in existence when this committee was appointed.

MR. ELIEL: But is not this matter I have referred to a part of this report?

MR. HELFMAN: I move that the suggestions and recommendations embodied in this report—notably in the second and fourth paragraphs of page 61, and the second and third paragraphs of page 62—be referred to a committee of three, to be appointed by the President for consideration and report to this Association. These paragraphs embody all the recommendations made in the report.

DR. ECCLES: In connection with the motion before the house, it will be important for this committee to put special stress on that recommendation asking the American Pharmaceutical Association to become the censor of the Patent Office in all matters pertaining to medicine. It will give strength and power to this Association, such as it has never before enjoyed. It would make it a terror to evil-doers, and it will affect the Association in a way beneficial to it in a thousand directions we cannot now conceive.

Mr. Helfman's motion was carried unanimously, and the Chair appointed on said committee Messrs. W. S. Thompson, of Washington; William McIntyre, of Philadelphia, and A. J. Corning, of Baltimore.

The Chair now called for the report of the Committee on Time and Place of Next Meeting, and Mr. Remington read the report as follows:

REPORT ON TIME AND PLACE OF MEETING.

Your Committee have had placed in their hands invitations to meet next year in Richmond, Cincinnati, Chicago, Niagara Falls and Put in Bay, Ohio. Your Committee recommend that this Association hold its next annual meeting at Put in Bay, Ohio, on Monday, September 4, 1899. The Council to be authorized to change the date within a limit of a week from the time mentioned.

JOSEPH P. REMINGTON,
JNO. F. PATTON,
T. A. MILLER,
A. R. L. DOHME,
JAS. F. GUERIN.

MR. ELIEL: I move to adopt the report of that committee as the sense of this Association.

DR. PAYNE: Before that motion is put, I would like to make a suggestion in regard to our next place of meeting. I have no particular axe to grind in the matter, but I would like to go there myself, and I am sure many of the rest of you would, that is, the city of Mexico. I have gotten rates to the point, and the representatives of the road are here now. I know it is a long distance, but I propose that as the place of next meeting, or one of the places to select from. I was not present when they had a meeting of the committee.

THE PRESIDENT: Do you offer that motion as a substitute for the action of the committee?

Dr. Payne: Yes, sir; I will offer as a substitute for the place named in the committee's report, the City of Mexico.

The motion was put to a vote and lost.

The report as made by the committee was then adopted.

The President: The next matter that should come before you is the report of the Committee on Beneficiary Features, Prof. C. S. N. Hallberg, of Chicago, Chairman. He is not present; and as there is no member of the committee present to make the report it will be passed.

The next committee is on the Meeting of 1900, Mr. Alpers, of New York, Chairman.

Mr. Alpers read the report as below, and explained that the third member of the committee, Mr. Ebert, of Chicago, could not be consulted, and his name was not signed to it.

REPORT OF THE COMMITTEE ON MEETING OF 1900.

Your committee would respectfully report that personal interviews and correspondence with members of our Association from all parts of the United States, indicate that a large majority are in favor of combining a trip to the International Exposition in Paris with the meeting of 1900. However, in order to give those who may not wish to participate in a transatlantic excursion the possibility of attending the meeting, your committee recommends that the place of meeting in 1900 be the city of New York, or a resort in the immediate vicinity; that the sessions of the various Sections be held without interruption, and that the trip to Europe at the close of the meeting form the one great feature of entertainment.

As to the arrangement for such a trip and the expense, your committee have been unable to formulate any plan, as all the transatlantic steamship lines that have been approached on this subject are unwilling to discuss the matter at this time. We recommend each individual member to consult with himself about the prospect of joining the party and be ready in 1899 to decide definitely whether he will go or not.

William C. Alpers, *Chairman*,
Caswell A. Mayo.

Mr. Feil: I move that the report be accepted and the committee continued.

The President: The next committee is that on Patents and Trade-Marks, William Bodemann, of Chicago, Chairman. Mr. Eliel, I believe, has something in connection with that matter.

The Secretary: I can say a word or two in connection with that report. The chairman of the committee sent a communication to the Association which was read before the Council, and by it referred to the other members of the committee, who will probably bring the matter up later. The report was not in good shape to present to the Association at large.*

REPORT OF THE COMMITTEE ON PATENT AND TRADE MARKS.

Your Committee regrets its inability at this time to report any practical work that it has accomplished.

The Committee, having fairly considered the field of its operation, is impressed with the belief that it may render very important aid to the people of the United States, as well as to the profession of pharmacy, by directing its labors to the task of procuring the repeal or modification of the present United States patent and trade-mark laws, so far as they may be applied to the patenting or trade-marking of medicines.

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* Note: The report was received from Mr. Thompson after close of the meeting, and is, therefore, inserted here.—The Secretary.

When a citizen of the United States is compelled by the laws of his own country to pay $1.00 for the same article his Canadian neighbor gets for 25 cents, and the difference goes entirely into alien pockets, there is something out of joint that needs the careful attention of the American people. People do not institute and maintain a governmont for the purpose of allowing that government to be used by aliens to rob the people.

Your Committee are convinced that it is only necessary to recite the facts involved in the gross abuse of the patent and trade-mark laws of the United States, in order that the people will, in their own right, demand prompt and efficient relief.

The wrong is not against pharmacists, as such, but it is against the whole people of the United States; and its injustice is so manifest, that only the facts, not arguments, are required to obtain redress.

Your Committee, believing that it may yet do effective work in the direction indicated in the report, would respectfully ask to be continued for another year.

Respectfully submitted,
W. Bodermann,
W. S. Thompson,
J. E. Morrison,
W. G. Duckett,
C. E. Dohme.

The President: The next report in order is from the Committee on National Department of Health, Mr. Remington, Chairman.

Mr. Remington explained in brief the substance of the report, the full text being presented herewith:

REPORT OF THE COMMITTEE ON NATIONAL DEPARTMENT OF PUBLIC HEALTH.

To the American Pharmaceutical Association:

Gentlemen: Your Committee, to whom was intrusted the duty of ascertaining to what extent pharmacy could be represented in the proposed new Department of Public Health, begs leave to report that they opened communication with the Congressional Committee having in charge the act creating a National Department of Public Health. Copies of this act were freely furnished members of our Committee upon application to Senator Mallory, the Chairman. The act proved to be one designed to protect the public health in times of prevailing epidemics like yellow fever, and provided safeguards for the protection of health by regulating inter-state traffic, and by the examination of persons suspected to be suffering from epidemic diseases.

After due consideration, your Committee arrived at the conclusion that an organized effort on our part to secure representation on the Board would, under the circumstances, be unadvisable.

Respectfully submitted,
Joseph P. Remington,
William C. Alpers,
H. M. Whitney,
Committee.

August, 1898.

The President: Unless there is objection, the report will take the usual course and be referred to the Committee on Publication.

The next report due is that from the Committee on Publication, Mr. Diehl, Chairman.

MR. DIEHL: The report is on the Secretary's desk. As it has been read before the Council, and approved by them, I do not think we need take up the time of the Association in reading it here again.

REPORT OF THE COMMITTEE ON PUBLICATION.

The Committee on Publication beg leave to report that the Proceedings of the forty-fifth annual meeting have been duly published and a copy of the same delivered about the latter part of February of the present year to every member entitled thereto according to the Treasurer's accounts. Fifteen hundred copies of the book were printed, of which 225 have been allowed to remain in flat sheets; 1,225 copies have been bound in cloth, and 65 copies in paper cover, of which 48 remain on hand at the present date. The cost of publishing and delivering the 1897 Report of Proceedings, owing to the somewhat smaller size of the book, was lower than that of last year, as shown by the following items:

Composition, paper and presswork (1,500 copies)	$1,580 89
Binding 1,225 copies in cloth @ 20 cts	245 00
Binding 65 copies in paper @ 8 cts	5 20
Illustrations	38 50
Expressage	312 67
Postage (foreign and domestic)	33 30
Journals for the use of the Reporter	43 00
Stenographer	125 00
Reporter's salary	750 00
	$3,133 56

Cost of Proceedings for 1896	$3,383 81
Cost of Report of Proceedings for 1897	3,133 56
Difference	$250 25

The Committee desire to express their indebtedness to Messrs. E. R. Squibb & Sons, Messrs. Merck & Co., Prof. Cremers, and Prof. Trimble, who kindly loaned electrotypes for the purpose of illustrating part of the Report on Progress of Pharmacy.

C. LEWIS DIEHL, *Chairman.*

July 1, 1898.

THE PRESIDENT: We will have, then, the report from the Auxiliary Committee on Membership, Dr. Whelpley, Chairman.

Dr. Whelpley read the report as follows:

REPORT OF THE AUXILIARY COMMITTEE ON MEMBERSHIP.

It has not been the purpose of the members of this committee to exercise undue influence in their efforts to secure new members. The committee is composed of representatives in each of the States and Territories, Provinces of Canada, the larger cities of the United States, and the Army and Navy. Each individual member has taken pains to familiarize the pharmacists in his own territory with the American Pharmaceutical Association, investigating the standing of parties making application for membership and answering questions from inquiring pharmacists.

The chairman of the committee has urged upon the presidents of the State Associations the propriety of mentioning the American Pharmaceutical Association in their annual addresses, and these officers have responded in a very liberal manner.

Working on this plan the committee during the past year has paved the way for a fu-

fure increase in membership in the Association rather than making special effort to see how many names could be presented at this meeting. We have felt the desirability of securing members who are likely to remain with the Association until removed by the hand of death.

The Secretary of Council Committee on Membership will report the number of names which we have presented.

H. M. WHELPLEY, *Chairman.*

The report took the usual course.

The report of the Committee on Status of Pharmacists in the U. S. Army, Navy and Marine Hospital Service was called for, and Dr. Payne, Chairman, explained the principal points in the report, the full text of which was as follows:

Mr. President and Fellow Members of the American Pharmaceutical Association :

Your Special Committee on the Improvement of the Status of Pharmacists in the United States Army, Navy and Marine Hospital Service, beg leave to make the following report:

At our meeting in Asheville, N. C., in 1894, the work of advancing the status of pharmacists in the service of the United States was inaugurated. The present committee was the one then appointed. Only a few vacancies have occurred since then from time to time, from several causes, and have been immediately filled as they took place. Our work has been largely a work of education. To obtain that status to which the pharmacist is entitled in the United States service, requires both an education of our public officers and such benign influences as prominent men can exert. We have been much impressed by the value of organization and systematic work in the operations of our committee, and feel that a somewhat similar campaign of education would be of great value to pharmacy as a profession if brought to bear upon the general public. As the appointments of our committee were not made until some time after our Asheville meeting, it was impossible to do anything during 1894. So the actual work at Washington was not well under way until 1895. During the session of the 54th Congress under the Democratic administration we presented our three bills, one for each branch of the service, copies of which have been given in a previous report. They were offered in the House by Hon. Chas. F. Crisp, on December 16, 1895, and by Senator A. O. Bacon in the Senate, on January 24, 1896.

We began our campaign vigorously in 1895, and worked hard with the senators and congressmen, and when our bills were presented in January, 1896, they were transmitted to the three departments which they would affect, which are those of War, the Navy and the Treasury. Untortunately each of the three departments gave an unfavorable report, and our bills would not be further considered by the Committees to which they had been referred. It is next to impossible to pass bills that have been unfavorably reported by the departments which they affect, and it is difficult to get the departments to approve legislation introduced by outsiders which involves changes of their customary routine.

At the beginning of the year 1896, Dr. J. Rufus Tryon, who was then Surgeon-General of the United States Navy, presented his usual annual report and in it suggested that the apothecary of the navy be made to rank as a paymaster's clerk, which would have been a still more unsatisfactory condition of affairs. As the naval apothecary had no legal status at all, and his position was changed from time to time (being governed by the varying regulations, which might be decided by the judgment or whims of each new Secretary of the Navy and the Surgeon-General), we felt that the pharmacist of the navy was in the worst position of the three branches of the service.

By active correspondence with Dr. Tryon and a strong presentation of the facts in the case, he was induced to modify this suggestion in regard to the rank of the naval apothecary, and in his annual report in 1897 he introduced our naval bill "in toto" and recommended its provision which accorded warrants to naval apothecaries. The Republican party coming into power this year, caused much additional work, as of course the change in administration involved changes in all the Secretaries and Assistant Secretaries and in a number of others whose assistance was of importance.

Hon. J. M. Long, of Massachusetts, became Secretary of the Navy, with Hon. Theo. Roosevelt, of New York, as Assistant Secretary, and Dr. Tryon, who had proven such a friend of ours as Surgeon-General of the Navy, was removed and Dr. Bates was appointed in his place. After serving but a short time during 1897, Dr. Bates passed away to join the great majority, and Dr. W. K. Van Reypen, of New Jersey, became Surgeon-General of the United States Navy.

In the Army, Gen. R. A. Alger, of Michigan, became Secretary of War, with Hon. Geo. D. Meiklejohn, of Nebraska, as Assistant Secretary, and Dr. Geo. M. Sternberg, of New York, remained as Surgeon-General.

In the Treasury Department, Hon. Lyman J. Gage, of Illinois, became Secretary, and Gen. O. L. Spalding, of Michigan, Assistant Secretary, and Dr. Walter Wyman, of Missouri, remained as Surgeon-General of the Marine Hospital Service.

At the special session of the Fifty-fifth Congress in 1897, Hon. Francis H. Wilson, of New York, re-introduced our three bills, as stated in our report last year, before the opening of the regular session of the Fifty-fifth Congress. In the fall, Mr. Wilson was appointed postmaster of Brooklyn. Regardless of these many changes, our position appeared to grow stronger and stronger. The Treasury Department made a small increase in the salary of its hospital stewards. The Surgeon-General of the Army wrote us that he was in favor of an increased salary for the army hospital stewards, and the Naval Department consulted with the Naval Committees of the House and Senate and drafted a bill which accorded all that the Naval Committee of the two Houses were willing to concede along the line of our requests. We asked for warrants for all the apothecaries and the title of pharmacists. They accorded us twenty-five pharmacists with the rank of warrant officers and the remainder of the naval apothecaries to have their present rank and pay established by law, but with the title of hospital stewards. In this way, all who are acknowledged as pharmacists are accorded the rank and pay of warrant officers. So we have accomplished a great advance in the Navy. We would have secured a larger number of warrant officers but that the Committees of Congress would not grant a larger number on account of the expenses of the government exceeding its income. The number of pharmacists will probably be increased, however, from time to time as needed. To Secretary Long, of Massachusetts; to Assistant Secretary Roosevelt, of New York, and Dr. Van Reypen, of New Jersey, all of the Navy Department, we are under many obligations for courtesies extended and for the construction and passage of the following bill, which was introduced in the Senate by Mr. Hale, during the second session of the Fifty-fifth Congress, on January 5, 1898; and in the House, by Mr. Boutelle, and recommended favorably by the Naval Department. The Hale Bill was as follows:

To organize a hospital corps of the Navy of the United States, to define its duties, and to regulate its pay.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a hospital corps of the United States Navy is hereby established, and shall consist of pharmacists, hospital stewards, hospital apprentices, first class, and hospital apprentices, and for this purpose the Secretary of the Navy is empowered to appoint twenty-five pharmacists with the rank, pay and privileges of warrant officers, and to enlist, or cause to be enlisted, as many hospital stewards hospital apprentices, first class, and hospital apprentices as in his judgment may be necessary, and to limit, or fix the number, and to make such regulations as may be required for their enlistment and government; enlisted men in the Navy or the Marine Corps shall be eligible for transfer to the hospital corps, and vacancies occurring in the grade of pharmacist shall be filled by the Secretary of the Navy by selection from those holding the rate of hospital stewards.

SEC. 2. That all necessary hospital and ambulance service at naval hospitals, naval stations, naval yards, and marine barracks, and on vessels of the Navy, Coast Survey, and Fish Commission, shall be performed by the members of said corps, and the corps shall be permanently attached to the Medical Department of the Navy, and shall not be included in the effective strength of the Navy, nor be counted as a part of the enlisted force provided by law, but shall be subject to the laws and regulations for the government of the Navy.

SEC. 3. That the pay of hospital stewards shall be sixty dollars a month, the pay of hospital apprentices, first class, thirty dollars a month, and the pay of hospital apprentices twenty-four dollars a month, with the increase on account of length of service as is now or may hereafter be allowed by law to other enlisted men in the Navy.

SEC. 4. That all benefits derived from existing laws, or that may hereafter be allowed by law to other warrant officers or enlisted men in the Navy, shall be allowed in the same manner to the warrant officers or enlisted men in the hospital corps of the Navy.

SEC. 5. That all acts and parts of acts, so far as they conflict with the provisions of this Act, are hereby repealed.

On January 25th, 1898, the following bill was introdnced in the House, at the second session of the 55th Congress, by Mr. Cummings, of New York:

To organize the Hospital Corps of the Navy of the United States, to define its duties, and regulate its pay.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Hospital Corps of the United States Navy shall consist of hospital apprentices, hospital apprentices, second class, hospital apprentices, first class, and pharmacists; and all necessary hospital service at naval stations on shore, and receiving ships, training ships, and sea-going ships of the Navy (including ambulance service), shall be performed by members thereof, who, with the exception of pharmacists, shall be regularly enlisted in the naval service. Said corps shall be permanently attached to the Medical Department of the Navy, and shall not be included in the effective strength of the Navy, nor counted as a part of the enlisted force provided by law.

SEC. 2. That there shall be as many pharmacists warranted as in the judgment of the Secretary of the Navy the service may require, but not more than one pharmacist shall be stationed at any hospital, laboratory, station, or ship, without special authority of the Secretary of the Navy.

SEC. 3. That hospital apprentices of the first class of the Hospital Corps may be detailed as acting pharmacists by the Secretary of the Navy, upon the recommendation of the Surgeon-General, whenever the necessities of the service may require, and, while so detailed, they shall be allowed the rank and pay of a pharmacist.

SEC. 4. That no person shall be warranted as a naval pharmacist except as hereinafter provided, unless he be a graduate in pharmacy, or has served by continuous enlistment as hospital apprentice, hospital apprentice second class, and hospital apprentice first class, and shall have passed a satisfactory examination before a board, to be designated by the Honorable Secretary of the Navy, as to his qualification for the position; and no person shall be eligible for such examination except by written authority of the Secretary of the Navy.

SEC. 5. That the Secretary of the Navy shall be empowered to enlist and cause to be warranted as many men in the Hospital Corps as the service may require, and to limit or fix the number, and make such regulations for their government as may be necessary; and any enlisted man in the Navy shall be eligible for transfer to the Hospital Corps as an hospital apprentice. Upon enlistment or transfer as hospital apprentice in Hospital Corps they shall be admitted for instruction to the training schools for nurses authorized by this Act to be established by the Secretary of the Navy at the principal naval hospitals. While undergoing instruction they shall perform duty as ward masters, cooks, nurses, and attendants in hospitals, and as stretcher bearers, litter bearers, ambulance attendants, and such other duties as may, by proper authority, be required of them. If found unfitted by any cause to receive instruction or to perform intelligently the responsible duty of attending to sick and wounded men, the fact shall be reported to the Secretary of the Navy, who shall authorize their discharge from the service.

SEC. 6. That the pay of hospital apprentices of the Hospital Corps, first enlistment, shall be eighteen dollars per month; that the pay of hospital apprentices, second class, if continuous from first enlistment, shall be twenty-two dollars per month; that the pay of hospital apprentices first class, if continuous from first enlistment, shall be twenty-five dollars per month.

SEC. 7. That all benefits derived by existing laws, or that may hereafter be allowed by law to other enlisted men of the Navy, shall be applied in the same manner to the enlisted men of the Hospital Corps of the Navy.

SEC. 8. That upon the passage of this Act all apothecaries at that time serving in the United States Navy shall be placed upon the list of warrant officers, with rank, pay and privileges of same, with the title of naval pharmacist, and their names shall be entered in the order of their admission to the service, and their previous service shall be allowed in regulating their pay.

SEC. 9. That nothing in this Act shall deprive an enlisted or appointed apothecary of a warrant as a naval pharmacist, and that they shall retain their position in the Hospital Corps of the Navy, and shall be eligible for duty both ashore and afloat.

SEC. 10. That all pharmacists who, upon the passage of this Act, shall have served the time required by law shall, upon their written request, be placed upon the retired list of the Navy as provided for other warrant officers; and those who, upon the passage of this Act, shall have reached the age of sixty-two years shall be placed on the retired list of the Navy, with the pay of a warrant officer, retired, of the highest class.

SEC. 11. That all acts or parts of acts, in so far as they contravene the provisions of this Act, are hereby repealed.

This latter bill, which was introduced by Mr. Cummings, of New York, was sent by us to him with the request of him to let us know if he thought best to introduce it on the ground that such a bill might be needed at a later date to meet the exigencies of the occasion. He immediately introduced it, but we soon became convinced that the Hale Bill was the only one of the three naval bills with which we could hope to succeed, and immediately used all our energies in its behalf.

The pharmaceutical journals have encouraged and endorsed our work almost without exception. Some of the great dailies have aided us very materially, and the various Pharmaceutical Associations, Boards of Pharmacy and individual pharmacists throughout the United States have heartily joined us in our work in every way in their power. Nearly all of the Pharmaceutical Associations have appointed State Committees, and have made the member of our Committee from their State chairman of their Association Committee. In many cases these Auxiliary Committees have done most excellent work.

We herewith submit copies of a few letters and extracts from letters which were written during our recent campaign, which will illustrate a number of points in regard to the work in hand. We have received hundreds of letters ably written and full of bright suggestions. We give the ones below on account of the valuable information they contain:

BALTIMORE, *June* 10, 1897.

DR. GEO. F. PAYNE, *Atlanta, Ga.*:

My Dear Sir: Permit me at this late date to thank you for the kind comments contained in your favor of April 2d, and referring to my article in the "American Druggist." March 28th, under the caption, "The Militia Pharmacist." Your letter did not reach me for some time, having first gone to Washington, D. C., then to Annapolis, and was finally forwarded to me here.

While I am strongly desirous of helping the badly-placed and poorly-paid so-called pharmacists connected with the army and navy of this country, I freely confess that my interest in the whole matter was awakened by the conclusion that the comparative professional standing of pharmacists is affected detrimentally by the ranking of these government employees and kept alive and fed by such thoughts. The Hospital Stewards of our State Militia are essentially pharmacists and do pharmaceutical work only; not so with the Hospital Stewards of the regular army. I find that *pharmacy* pure and simple, is only a part, mayhap a small part, of his make-up. I think I have found also that he has sought to belittle pharmacy, and striven to enlarge the field of his operations that he might, through his multitudinous offices, make his importance more directly felt. He is neither Assistant-Surgeon, Director, Nurse, Accountant, Sanitary Inspector, Commissary nor Pharmacist, but something of all. As an imperfect combination, I can see no possibility of success. By becoming thoroughly and well rounded in any one, he would, without doubt, find not only a possible but a probable avenue to proper promotion. After careful investigation and mature thought, I am now fully convinced that *our* efforts should be directed toward securing the restriction of the duties of government *pharmacists*, who should invariably be graduates of pharmacy, to strictly pharmaceutical work. I believe it will be quite easy to secure for this new officer, not only proper pay, but a commission. If this is a new line of thought, let me beg you to follow it up.

Would you sanction a paper for the American Pharmaceutical Association containing such a suggestion?

Medicine will, I believe, soon assert herself and deny to these nondescripts the right to encroach upon her domain.

If Dr. Culbreth, who represents this State upon your Committee, has properly reported, you know we have done considerable work here to assist your body.

Our organization "Military Pharmacists' Association, Maryland," is quite active, and we have profitable and pleasant meetings once a month.

Begging pardon for the length of this, and assuring you of my great interest for pharmacy's sake, I am,

Yours very truly, H. P. HYNSON.

ST. LOUIS, *December* 13, 1897.

DR. GEO. M. STERNBERG, *Surgeon-General U. S. Army, Washington, D. C.:*

Dear Doctor: I have received the communication dated December 1, 1897, addressed to Mr. Geo. F. Payne, Chairman Committee American Pharmaceutical Association, Atlanta, Ga.

I have no idea that the pharmacists employed by the United States Government were such *hybrids* as you describe them. You say: "These non-commissioned officers have *many other* duties quite as important as those connected with the dispensing of medicines." May be they are not pharmacists at all; but if they did not belong to the profession, the American Pharmaceutical Association would certainly not make efforts to improve their standing.

I would ask you, what is the standing of the medical man, the doctor, in the army? Does the government mould him into a hybrid similar to the pharmacist? If it does, I pity him, and protest with all my heart against such unwarranted and unjust treatment. I believe it to be your bounden duty to help improve his standing as far as lies in your power. The "esprit de corps" should impel you to this. In the same manner, I believe you would do a kind and just act if you would aid to strip the pharmacists in the government's employ of the "hybridism" already referred to.

Is the government really so poor that it must economize in such a small way? Cannot the government employ competent pharmacists as *such*, and give them proper rank in the army and navy? Pharmacists are able to make many chemicals, and all pharmaceutical preparations, tablets included, as well and much more correctly than the factories.

I would most respectfully draw your distinguished consideration to my way of looking at this matter. There are some 40,000 pharmacists in the United States; many of these are eminent men, known on two continents for their ability and scientific attainments. All are considered law-abiding citizens, yes, good citizens and tax-payers. If the government gives the pharmacists in the army and navy the rank which they should have, it honors an ancient and deserving calling, besides bestowing honors on the 40,000 pharmacists of the country. Don't you think our beneficent government could well afford to confer this small favor, at the same time performing an act of simple justice long deferred? With assurance of highest esteem, I remain,

Yours very truly, G. H. CHAS. KLIE, M. D.

PHILADELPHIA, *December* 13, 1897.

SURGEON-GENERAL GEO. M. STERNBERG, U. S. A.:

Your type-written copy of a letter addressed to Mr. Geo. F. Payne, which was sent to me, I have no doubt, fully expresses your views on the subject of improving the status of pharmacists in the army, You say that there is a misapprehension on the part of pharmacists with reference to the position of hospital stewards, and you say that the latter "have many other duties quite as important as those connected with the dispensing of medicines, and that the dispensing of medicines is done at times by a detailed private of the hospital corps;" further on you say, "that hospital stewards are not asked for any great proficiency in the art of the pharmacist, and this is not essential, as our medicines are largely supplied from the manufacturers."

This clear statement from the official head of the medical department in the army, discloses a condition of affairs which certainly shows a very low standard for a department of a progressive government, having for its aim the protection of the noble men who are willing to risk their lives for their country.

It is certainly a revelation to be informed that this government depends upon ready-made medicines, and does not care to employ competent apothecaries who can compound accurately the prescriptions of the attending surgeons; it leads them to the inference that when the proper medicine indicated in a given case is not in stock among the ready-made preparations, that the surgeon is compelled to take the nearest on hand; in other words, to make the treatment fit the tablet or fluid extract, thus failing to administer to the patient exactly what should be given. This can justly be called haphazard pharmacy, and while excusable in emergencies or on the frontier, is surely without justification in the majority of cases. I sincerely trust that you will be willing to make such changes in this branch of the service as will give the men who are unfortunate enough to be cut down by disease when in discharge of their duty, the best service possible, and one step in this direction is the raising of the qualifications of those who handle medicines so that they may be more than mere fillers of requisitions, but be able to intelligently compound the prescriptions of the medical advisers. With great respect, I remain, Very truly yours, JOSEPH P. REMINGTON.

ATLANTA, GA., *February* 7, 1898.

MR. ——— ———:

Dear Sir: Yours of January 16th at hand with the enclosure from Mr. ——— ———. In regard to General Sternberg's position regarding the increased pay for hospital stewards, I regret that he has not enough interest in it to make such a request or suggestion in his report, as he has had two years in which to do it. Gen. Sternberg seems to have a rather small opinion of the pharmaceutical requirements of the army hospital stewards. From the way in which he has written to myself, he seems to think that the army hospital steward is chiefly to dish out ready-made prescriptions, such as tablets, pills, fluid extracts, etc., and that their attainments on this account are not obliged to be of a very high character.

This position, it seems to me, is quite a slur upon the medical officers themselves, for if the apothecary is principally a machine for dishing out ready-made prescriptions, the medical officer is something of a machine also if he cannot originate new combinations and does not know how to utilize the ability and the methods of the modern pharmacist. Other civilized governments recognize the fact that it requires skilled pharmacists to meet the requirements of modern medical men, and the United States should certainly not be less progressive in matters of such vital importance.

The hardest fight that we can have now before Congress is for an increase of salary, as everybody seems to be against increasing appropriations, on account of the income of our government being less than its expenditures. Our bill in present shape really seems to me to stand as good a chance as it would if it had only the increased salary feature.

I would like to see some one else introduce a bill simply asking for the increased salary, and would try to secure its passage. If Dr. Sternberg reports the salary feature of our bill favorably, which he can well do if he is sincere in the matter, our friends might secure the passage of that part of it by dropping the other features of the bill. We are in favor of any material advance for the pharmacists in the service of our government;

but if we constantly change our bill, it will be a hard matter to keep up any kind of organized fight.

I am certainly in favor of any advancement in salary, rank or otherwise.

Yours sincerely, GEORGE F. PAYNE.

DUBUQUE, IOWA. *February* 9, 1898.

PROF. G. F. PAYNE, *Atlanta, Ga.:*

Dear Sir: Your circular in regard to army and navy appropriations is at hand, and has already received my attention, inasmuch as I have before this addressed the gentleman in Washington on the subject. To-day I have again sent another letter to General Henderson, M. C., who is a fellow-townsman and my warm personal friend. I take all the more interest in this measure, as I have served as hospital steward in the army during the years of the war, and know where the shoe pinches. As I have explained to General Henderson, I have often served in army hospitals with thousands of dollars' worth of property intrusted to me, dispensing medicines to hundreds of patients each day, looking after their dieting, bedding and everything, for which I was rewarded with a sergeant major's position, rank and emoluments; at the same time that hospital would swarm with young doctors, fresh from colleges, who served as dressers, drank up our whiskey, and drew first lieutenants' pay.

Even such positions as medical storekeepers and medical purveyors, who perform the duties of wholesale druggists, are not given to hospital stewards, but to surgeons. When I received my appointment as hospital steward I had a German diploma, and was an amateur. I trust that the efforts of the Pharmaceutical Association will be crowned with success. The status of the Army and Navy Pharmacist should be raised in both rank and pay, and the position of storekeeper and purveyor should be given to pharmacists with ranks of captains or lieutenants.

(Signed) Yours very truly, T. W. RUETE.

WASHINGTON, D. C., *February* 10, 1898.

DR. GEO. F. PAYNE, *Atlanta, Ga.*

Dear Sir: It has been the custom for many years to place senior medical officers of the army in charge of our medical supply depots. The suggestion has never even been made that hospital stewards should be placed in charge of these depots, and the duties are not simply those of wholesale druggists.

Very truly yours, (Signed) GEO. M. STERNBERG.

WASHINGTON, D. C., *February* 28, 1898.

DR. GEO. F. PAYNE, *Atlanta, Ga.*

Dear Sir: In reply to your letter of February 22, I would say that the duties of officers in charge of medical supply depots are to purchase and issue supplies under the orders of the Surgeon General of the Army, make contracts for the same, to act as disbursing officers, paying all bills contracted by the Medical Department for medicines, medical attendance by civilian physicians, hospital furniture, accounts for washing, etc. We do not manufacture any medicines at our supply depots, and the supply officers need not have any knowledge of pharmacy, as they are not called upon to decide upon the quality of medicines furnished. The question whether medicines are up to the standard required is decided by an expert chemist attached to the Surgeon General's office in Washington, who examines samples submitted by the contractors.

Very truly yours, (Signed) GEO. M. STERNBERG.

We can see no justice nor reason in the United States medical supply depots being placed in charge of surgeons instead of pharmacists. It is true the duties are most responsible and important, and a commissioned officer should be in charge; but it should be a pharmacist who has been educated for such work, and not a surgeon, whose education does not prepare him for such duties.

We believe the government could be readily induced to commission two or three pharmacists for such duties if all the facts in the case were properly presented.

——— ————

Dr. Geo. F. Payne, *Atlanta, Ga.*

Dear Sir: Your letter of the 7th instant received this morning, and I hasten to reply in order to enclose a "circular letter" from the Supervising Surgeon General of the U. S. Marine Hospital Service relative to the pay of the hospital stewards. This is the much talked of and vaunted beneficial change in favor of the stewards. It is like unto the labor of the mountain in bringing forth a mouse. To summarize the changes: A steward receives $120 per annum *more* upon his entry to the service than formerly; this change is made to attract applications for appointment. But after being appointed he has to wait three years for promotion to the $720 grade instead of two as by previous regulation. This equalizes matters so that he receives exactly the same amount of pay for his three years service as under the old rates of $480 for one year, $600 for the second year, and $720 for the third and succeeding years. A great and munificent increase truly! After five years service, the steward receives ten per cent. additional, and upon the expiration of ten years an additional ten per cent., making in all twenty per cent. This ends it, but the commissioned officer goes right on with his longevity pay until it reaches *forty per cent.* The rank injustice of the whole regulation is only too evident. Something had to be done. The agitation headed by you for the last two years could not be ignored, and that empty pretense of "something" is before you. To say that I am indignant does not express it. The whole thing ought to be shown up in the pharmaceutical journals. Our men have been kept luke-warm, and some of them out of the fight altogether, by this "ignus fatuus" of promises that all they asked for would be given in the "new regulations."

At your leisure let me know what you think of the matter as it stands.

Yours sincerely, ——— ———

Dr. Geo. F. Payne, *Atlanta, Ga.:*

Dear Sir: Your letter of the 12th instant is received, and contents noted.

The invitation extended to me to write an article on the subject of the new regulation regarding the pay of Hospital Stewards of the Marine Hospital Service is highly appreciated, but the honor must be declined. I may say in a personal letter what would be construed into gross disrespect to the Surgeon-General, the Secretary of the Treasury and "The President," were it to be published in the daily print, and it is not my intent or purpose to be either disrespectful or insubordinate.

A careful analysis of the new regulation governing the pay of Hospital Stewards of the U. S. Marine Hospital Service, which went into effect December 1, 1897, shows that the condition of the steward coming into the service is not bettered at all. Under the old regulation he received $480 for the first year, $600 for the second year, and $720 for the third and succeeding years. Under the present regulation he receives $600 per annum for three years, before he can be promoted to the grade of "Senior Steward," which gives him $120 more the first year and $120 *less* the third year, thus leaving his compensation for the first three years just the same as it was under the previous arrangement. The placing of the stewards under civil service regulations compelled the Marine Hospital Bureau to do something to attract candidates for the examinations, and the pay was increased for the first year to make the position more attractive. How this device will work remains to be seen. It is to be hoped that no self-respecting pharmacist will be caught by so transparent a "flim-flam" game.

The oldest stewards have been granted two ten per cent. increases, for five and ten years' service respectively, which while it is an open acknowledgment of the justice of their claim, is in no way commensurate with their deserts. During the yellow fever epidemic of last season on the "Gulf Coast," no less than seven stewards (twenty-two per cent. of the whole corps) were on duty in the infected district. Four of the seven were non-immune to the disease and put their life in peril just as much as any soldier going into battle. It is bravery for a man to go into the fray with a tangible enemy, but what can you say of men who battle with an unseen foe, who strikes when the victim knows it not? These men were in just as much danger as the medical officers, and are deserving not only the credit, but a remuneration commensurate with the very important duties they performed. The claim made by the Chief of the Bureau that "the duties of a steward as a pharmacist are but a small part of his daily routine," as an argument against the increase of pay advocated by the American Pharmaceutical Association, is fallacious; for though he *must* be a pharmacist by civil service regulation, he must also be the possessor of many other acquirements and accomplishments. The talent required as the executive officer of a hospital, to keep its books, to manage its attendants, to purchase the necessary supplies, to supervise repairs and additions, to act as the aid and support of the medical officer, and as a conservator of good order and discipline, is certainly of a high order, and all this, and even more, must the Marine Hospital Steward be possessed of. Be it said to the credit of the medical officers, that they are not slow to acknowledge among themselves, and to the stewards at times, that a good steward is the "keystone" to the hospital establishment; but an unwarranted feeling that to allow the corps any marked increase of pay or any rank and privilege consequent thereto would derogate their own official importance, has kept them from publicly advocating the action taken by the American Pharmaceutical Association.

I know you will pardon the long-drawn-out letter your request has evoked, but when I start to ride a hobby, why I just ride, that's all. If my ideas are of the least use to you, take them and the credit, too, as credit to me, just at this stage of the game, might be uncomfortable, to say the least.

If you have now, or in the future, any printed matter, either periodicals or pamphlet, on the subject under discussion, I should be under obligations if you would remember me.

Yours sincerely, ——— ———.

From these two letters, it will be seen that we have accomplished something with the Marine Hospital Service. We have gotten the Hospital Stewards placed under the civil service regulations; this was what they desired, and has benefited them somewhat. There has, also, been a small increase of salary. We have surely gotten the ball rolling, and it should certainly now be easier to secure further advantages. The public is very ready to have the pharmacists secure fair treatment, and as we learn who our real opponents are, we can manage to better and better advantage.

During the yellow fever epidemic in New Orleans last year, we saw a copy of one of the reports from a Maine Hospital Surgeon in charge to the Supervising Surgeon General, Dr. Wyman. The Surgeon requested the forwarding of hospital stewards to the yellow fever districts, as he found such men much better posted in sanitary work and similar duties required, than were many of the young surgeons sent to him, *and besides, they cost the government far less.* This is certainly a strong argument in favor of our government according the Marine Hospital Steward much higher recognition than he now receives, and comes from one thoroughly competent to judge of his value.

The Hospital Steward in the Army of the United States enters as an enlisted man, studies pharmacy under the medical officers (these, as a rule, never having studied pharmacy themselves). He must carry a gun as an enlisted man the first year; then he can become a hospital attendant and serve another year; then stand an examination for the position of acting Hospital Steward; then, serving a year longer, he can secure the position of Hospital Steward. Can such a process make what the government requires in the regulations, that is, "a trust-worthy pharmacist?" The volunteer troops of our States do far better than this, as some of them require all their Hospital Stewards to be registered pharmacists. Our government certainly does not deliberately permit men to practice pharmacy as Hospital Stewards who are not pharmacists, as this would be a flagrant violation of the laws on the subject of pharmacy of nearly every State in the Union. How can a self-respecting pharmacist go through the mill required, with no higher position finally attainable than that of Hospital Steward, with the rank of Ordnance Sergeant? A well-educated surgeon has a fine field in the army; a well-educated modern pharmacist would do far better in our army service to throw his education to the winds and become a United States letter-carrier, who has to know only how to read and write. As letter-carrier, he could secure a much better salary, shorter hours of labor, and would not have to expose his life in time of war nor epidemic.

The army Hospital Stewards of the State Militia were beginning to organize before the recent war. We had considerable correspondence with them in nearly every State in the Union.

The following letter explains the thorough manner in which the State of New York is starting in this work:

NEW YORK, *May* 1, 1898.

DR. GEO. F. PAYNE, *Atlanta, Ga.:*

You are hereby notified that there will be a meeting of the Hospital Stewards of the first and second brigades to be held at the 23d Regiment Armory, Bedford and Atlantic Aves., Brooklyn, on May 7th, at 8:30 p. m. sharp.

Your presence is respectfully requested.

SGT. THOS. W. LINTOY, *Reg. H. S., 7th Infantry, N. G., N. Y., President.*
SGT. THOS. M. DAVIES, *Reg. H. S., 8th Infantry, N. G., N. Y., Secretary.*

Association of Military and Naval Apothecaries of the State Forces:

Sir: Would very much like to hear from you in regard to our movement. Any advice you can offer I think the Association would willingly act on. This is our third meeting and we have only about organized and elected our officers; full detail as far as we have gone was fully explained in the Pharm. Era of April 22d.

Yours most respectfully, THOS. M. DAVIES.

CONSTITUTION.

ARTICLE I.—*Name and Object.*

Section 1.—This organization shall be known as the "Association of Military and Naval Apothecaries of the State Forces."

Section 2.—Its object shall be to unite the hospital stewards and apothecaries of the State Forces in a general effort to improve their condition in the service, and by concentrated action to aid the hospital stewards and apothecaries of the United States service in their efforts to obtain proper rank and recognition.

ARTICLE II.—*Membership.*

Any hospital steward or apothecary in the National Guard or Naval Militia shall be eligible to membership in this organization upon paying to the Treasurer the required dues.

ARTICLE III.—*Fees, Dues, etc.*

The dues shall be one dollar per year payable in advance on the first day of May of each year.

ARTICLE IV.—*Officers and Committees.*

The officers shall be a President, Vice-President, Corresponding Secretary, Recording Secretary and Treasurer. They shall discharge the ordinary duties of such officers.

The standing committees shall be an Executive Committee. They shall be as nearly representative as possible, and shall consist of five members to be appointed by the President.

The President shall be ex-officio a member of all committees.

ARTICLE V.—*Elections.*

All officers and committees shall hold office one year, the Annual Election being held at the first meeting in May.

ARTICLE VI.—*Meetings.*

Meetings shall be held in May, September, December and March, at a place to be determined at each preceding meeting.

ARTICLE VII.—*Amendments.*

This Constitution may be amended by a two-thirds vote of all the members present at any regular meeting, provided at least one month's notice of proposed change be given.

The Spanish-American war will probably cause a reorganization of our volunteer State forces, probably under some national system. This is our great opportunity; used properly we can accomplish what we desire both for the State and national forces. It would seem the opportune time to have our military pharmacists commissioned as Second Lieutenants. In the supply depots there are our Chief Medical Purveyor, with rank as Colonel, two assistant Medical Purveyors, with rank as Lieutenant-Colonels, one Medical Store-keeper, with rank as Captain. These four places already exist, but instead of being filled by pharmacists, as they should be, they are filled by surgeons.

Other countries give these places to their pharmacists. Such a change would be a most advantageous one for our government, and would not involve the expenditure of a single extra cent, but it would accomplish much for our profession, which has at last decided to stand up for its rights and do battle for them.

DR. GEO. F. PAYNE:

Dear Doctor: I was very much pleased to see the enclosed article by yourself in yesterday's "New York Herald," and I believe not only every apothecary, but all white enlisted men in the navy were equally as well pleased.

There are instances (the U. S. S. Fern is one) where an apothecary has for several years past fulfilled the duties of a medical officer, yet is required to mess at the same table as a negro. The above ship always carried a medical officer (and still rates one) until about four years ago, when he was detached and an apothecary sent in his place. While we do not exactly approve of apothecaries doing the duties of a doctor, yet it shows that as long as in the eyes of the Department a doctor does the duties he is entitled to a commission, yet once an apothecary assumes the duties, "any old thing" is good enough for him in return.

We will try to do everything we can at our end of the line this fall, and if we can be of any service to you, kindly let us know.

Very sincerely yours, ——— ———.

(*From New York Herald.*)

GOVERNMENT APOTHECARIES.

Correspondent says they should have a higher rank.

To the Editor of the Herald: You are probably aware that the American Pharmaceutical Association is now carrying on an active campaign to secure a better status for pharmacists in the service of our government. You have already said some kindly things for our movement in the past, and I would now like to have you say something on the subject.

We have made the point that the apothecaries in the United States Navy are required to be educated men, graduates in pharmacy, and yet they only rank with the men before the mast, not even ranking as warrant officers, who are the mechanics of the ship. The apothecaries are required to be educated men and occupy most responsible positions, as in the absence of the medical officer, who bears a commission, they are the next in authority, and there are cases on record where vessels of war of the United States, bearing a large crew, have been dependent altogether upon the services of the apothecary for their medical attention.

Now, while some may believe in social equality with the negroes, there are others who do not, as evidenced by the action of the Northern Mechanics' Colony in Georgia at Demorest, and the Northern Veterans' Colony at Fitzgerald, Ga., excluding negroes altogether from residing in their precincts.

We have just learned that S. O. Schetky, the apothecary of the Nashville, who was recently taken ill, was placed in the ward among the negro sailors and enlisted men. This treatment of an apothecary who is required to be Ph. G., and of whom so much is demanded by the naval service, certainly shows very little respect for pharmacy as a profession.

I would appreciate it if you would call attention to this matter, as we expect to make quite an active campaign before the coming Congress. GEORGE F. PAYNE.

ATLANTA, GA., *October* 28, 1897.

ATLANTA, GA., *November* 2, 1897.

W. K. VAN REYPEN, M. D., *Surgeon-General U. S. N., Washington, D. C.:*

Dear Sir: Permit me to congratulate you upon your appointment to the important office of Surgeon-General of our magnificent and growing navy. From all that I have heard of you I am sure that your regime will be one in which there will be a marked elevation in the status of pharmacists in the naval service. I have heard that you are quite favorable to pharmacists assuming that position in the navy to which they are fully entitled.

Our bill which came up before the last Congress was turned down by the Naval Department, under a misapprehension I feel sure, judging by many subsequent letters which were written to various gentlemen throughout the United States by those in authority. We had a majority of the House and Senate promised to vote for our bill to make naval apothecaries warrant officers during the last Congress, but the unfavorable report of the Naval Department kept our bill from coming to a vote. Some of the members assured me that they received at least a thousand letters each, urging them to vote for the bill.

As Chairman of the Committee of the American Pharmaceutical Association, I beg you to look very closely into the present status of naval pharmacists, and give them that consideration they deserve. That a graduate of pharmacy should be forced to serve as a man before the mast, and as the inferior of the sailmaker and the carpenter, is very galling to the profession throughout the United States. Less than a hundred years ago the medical profession occupied a similar degraded position in the service. That position has been marvelously bettered, but the poor apothecary still remains a man before the mast and without a legal status.

We expect to make a stronger effort than ever before the coming Congress, as we have our forces more thoroughly organized, and your friendship in the matter will be deeply appreciated by us all throughout the United States.

I enclose you a clipping (see above) from one of the northern papers, which gives us some idea of our views on this subject. The American Pharmaceutical Association has appointed a committee from every state and territory in the Union to carry on a proper correspondence in regard to this subject. We appeal to you to help us in this matter. We understand that you are very favorable to us, and we can assure you that your friendliness will not be forgotten by the 150,000 pharmacists scattered throughout the country. We find a large percentage of the medical profession warmly interested with us in this matter, for they feel that elevating the pharmacists in the service can but redound to their own benefit. With much esteem, I remain,

Very respectfully, GEORGE F. PAYNE.

November 21, 1898.

My Dear Doctor: By the way, there is a little matter of navy regulations which it may interest you to know; it is the new copy of regulations which succeed in effect the wording of that circular I sent you about the requirements for naval apothecaries, and which you had printed in full in those pamphlets sent out last winter. The new regulations read as follows: "A candidate for examination and first enlistment as apothecary must be a graduate of some recognized college of pharmacy, and must be between twenty-one and twenty-eight years of age. Applications for first enlistment as apothecary must be referred to the Bureau of Navigation. When practicable, applicants for the position of apothecary will be examined by a board of three medical officers. They must pass the usual physical examination, and must present testimonials or certificates as to character, good habits and sobriety. They will also be required to pass a satisfactory professional examination." You will notice that the scope of the examination is not outlined as was in the circular, but the point I wish to call your attention to, and one which I believe can be made to count for us, is the word professional in connection with examination. They certainly cannot claim that a man that is not of a profession should pass a professional examination; so if he must pass a professional examination he must of necessity be a professional man, and as such is clearly entitled to professional consideration.

With much esteem, ——— ———.

DR. GEO. F. PAYNE, M. D., PH. G., *Atlanta, Ga.*

We have received a number of letters from the naval apothecaries similar to the one below:

My Dear Doctor: I have this day received from Washington a copy of the bill for the Naval Hospital Corps, and it seems to me as though it is as fair a bill for us *all* as could be introduced.

While it would be suicidal to try and get warrants for the ninety apothecaries now in the service all at once (it must come gradually), the bill introduced in the Senate, No. 3010, which has the approval of both the Secretary and the Surgeon-General, might be passed, and I think *all* our forces should be brought to the front for this one grand end.

I think the corps ought to be thankful for *this bill*. Of course some will be disappointed at first in not getting the warrant, still I think the young men just entering the service ought not to expect quite as much as those who had long years of service; still they will have promotion to look forward to, and in time the warrant will come to those who may deserve it.

And you, Doctor (as our advocate), I hope, will urge the American Pharmaceutical Association and all good people, to do all in their power to get the bill through. It is the only bill that will have any show with this Congress, and it will benefit us all.

I enclose a copy of the bill. Should be pleased to hear from you.

Very sincerely yours, ——— ———

P. S. This bill has been offered by the Chairman of the Naval Committee to the Senate, and will be offered by the Chairman, Mr. Boutelle, in the House.

A somewhat similar letter to this has been written in reply to a number of inquiries:

ATLANTA, GA., *July* 20, 1898.

MR. MORTIMER S. WOOSTER, *Norwalk, O.:*

Dear Sir: Your letter to Dr. J. U. Lloyd has been referred to me by him for reply, as Chairman of the Special Committee of the American Pharmaceutical Association, which has charge of the improvement of the status of pharmacists in the service of the United States.

You ask concerning the chances of promotion to the position of pharmacists in the United States Navy. I have heard that the promotion will be made from the most efficient of the present naval apothecaries. I am not sure, however, that this is correct, as it may only have been the impression of the apothecary who gave me the information. I have seen no authoritative statement as to just how the new pharmacists will be selected. The Department has written me that the selections will be made upon merit, and not upon influence.

As to whether the Hospital Steward will be any better off than the old apothecary, it is impossible to say just now. The natural inference, however, is that he will be, as the pharmacist ranking as a warrant officer will give a more elevated status to the whole corps. Also this would seem to be the case when we consider that the hospital apprentice, second class, will draw twenty dollars per month and first class thirty dollars. As there will be more warrant officers added from time to time, as the service will require, and a gradual spread out, we feel that the conditions will be very decidedly improved.

If the American Pharmaceutical Association keeps up with its present agitation, this improvement ought to go on steadily.

As to advising you to go into the service, I certainly do not feel that I am in position to suggest such a step to any ambituous, educated young man, as he can only advance as far as warrant officer. If we succeed in what we wish to accomplish, that is, to put the supply depots in the hands of pharmacists, then we will certainly have commissioned pharmacists with considerable rank, and there will be inducements for the best of men to go in; but when the highest attainable rank is only that of warrant officer, we cannot consider such position as ample to satisfy a man of proper ambitions and ability. This advance has been a very distinct one, and with a few commissioned officers, of high enough rank, we will feel that we have a service to be proud of, and one into which we could advise young men to enter.

Yours truly, GEORGE F. PAYNE.

We give below copies of two letters which will illustrate how we fought for our cause when critical occasions arose. These letters were sent to nearly every pharmacist in each particular State, and when occasions arose other States were written to in a similar way; thus powerful influence was exerted where it would do the most good. Pharmacists, with their peculiar class of business, are in a position to exert very powerful influence if they care to do so, and all seem ready to work; they only wish to be shown what should be done, and they do it with a will.

ATLANTA, GA., *May* 18, 1898.

Dear Sir: On May 12th the Hale Bill came up before the House for passage. The only objector to unanimous consent to act upon it was Hon. ———, of ———, of your State.

Will you immediately write him a brief letter asking him to support House Bill 10220, presented by Mr. Boutelle, which accords warrants to twenty-five pharmacists in our naval service. Urge upon him the fact that the position of the pharmacist on shipboard is most important—he being required to fill the place of the surgeon in his absence, and do much of the work in the treatment of the men on board. As more men die in war from disease than from wounds, he can readily recognize how important it is that the position be filled by competent men. The pharmacists of the United States think that this position should be made attractive enough to cause them all to be filled by American citizens, which certainly has not been the case in the recent past. Almost every other civilized country accords commissions to their pharmacists, hence the rank of warrant officers is a very modest request, for those of the best ability in the service. Impress upon him the fact that at the present time the apothecary has no fixed status in the naval service—each Secretary of the Navy changes the regulations governing the matter to suit his own wishes. This is a very unsatisfactory plan, as it cannot be expected that each new Secretary of the Navy thoroughly understands the conditions governing the naval apothecary. The pharmacist in the U. S. Navy is certainly entitled to some definite legal status.

Almost any kind of a brief note, asking him to support the bill, will be effective. We do not know that he is really opposed to it, but he caused it to be side-tracked for the present that he might look into the matter.

Your immediate attention to this will be appreciated.

Yours truly, GEORGE F. PAYNE, *Chairman.*

Urgent letters similar to this were sent again and again to each of the committee, and sometimes to all the pharmacists in a state when special work was needed.

ATLANTA, GA., *May* 31, 1890.

My Dear Doctor : As one of our Committee, you have always been ready to respond when called upon.

Just now seems to be the most critical time with our cause, as regards the naval apothecary. The Hale Bill, which was in the Senate, has just been presented (with favorable report by the whole Naval Committee) to the House for favorable consideration. This Bill accords warrants to twenty-five pharmacists, and drops the title of apothecary altogether; so, you see, it really gives our profession that recognition for which we have labored so hard, as all the pharmacists in the navy hereafter, under this Bill, will be warrant officers, and the inferior ones will be Hospital Stewards and Hospital Apprentices, first and second class.

Please write a brief note to each one of your Representatives, asking them to support this Bill, which has just been reported favorably by the Naval Committee of the House. It is House Bill Number 10220; it is the same Bill which in the Senate was known as the Hale Bill, Number 3010. Please attend to this matter immediately, as the Bill is likely to come up for final vote almost any day; also, try to drop a line to a few of the prominent pharmacists throughout your State, and ask them to write, and get others to write, to the Congressmen from your State. It looks as though we were now upon the verge of final success, in regard to securing what we started out for in the navy, and that is warrants and the title of pharmacists.

Yours fraternally, GEORGE F. PAYNE, *Chairman.*

We will not tire you with a further recital of the many details of the work which we have done during the past year.

Our Chairman sent out many thousand letters over the whole United States, and every committeeman did yeoman work in his respective State and a number of them were active in States besides their own. We believe that we have labored systematically and so organized our forces that our weight and influence was strongly felt, not as much as we would have liked it to have been, but as much as the small funds at our command would permit.

In the Department of War, we have accomplished but little in actual results, that show upon the surface, yet the foundation has been laid for some very effective work. Dr. Sternberg is probably really friendly to us and may yet give us much valuable aid, although some seem to think that he does not realize that a pharmacist can know some things that a surgeon does not know.

In the Marine Hospital Service, we succeeded in having the whole service placed under the provisions of the civil service. We did this by direct correspondence with the President. This gives the Marine Hospital Steward a more definite status; he has also obtained a small increase in salary. In the navy, where matters were least satisfactory, we have practically accomplished all that we started out to do, and have incidentally increased the salaries of the hospital apprentices, first and second class. All of this has been accomplished without the cost of a single cent to the Association; for to offset the appropriations of $106.71 in 1896 and $115.79 in 1897, a total of $222.50, forty-three pharmacists in the service of our government joined our Association last year to show their appreciation of our work, and all paid their dues in advance, a sum of $215.00, and when it is considered that this is an annual payment it would seem that our bread cast upon the waters will be returned to us in full every year. At this present meeting an additional number of military pharmacists have become members. The following were our receipts and disbursements for the year:

To cash.
1897.

Nov. 24.	1000 2-cent printed and stamped envelopes	$23 75
Nov. 27.	500 2-cent plain stamped envelopes	10 90
Nov. 29.	75 2-cent stamps	1 50
Dec. 8.	50 2-cent stamps	1 00
Dec. 21.	220 2-cent stamps	4 40
Nov. 29.	Tisdale, stenographer	40 00
Dec. 9.	Nagle, stenographer	16 00
Dec. 21.	Picard, stenographer	12 00
		$109 55

By cash.

Aug. 18, 1896.	A. Ph. A. appropriation $50.00 less $9.21 expended by Secretary	$40 79
Aug. 28, 1897.	A. Ph. A. appropriation $75.00 less $6.24 expended by Secretary	68 76
		$109 55

To cash.
1898.

10,000 letter sheets	$57 00
Stenographers	284 30
Druggists' Directory	5 00
Stamps	37 14
Stamped envelopes	142 00
Mimeograph and supplies	15 00
Army and Navy Journal	1 50
	$542 54

By cash.

Balance from 1897	$91 85
From friends of Navy since statement of 1897	280 00
From friends of the Marine Hospital Service since statement of 1897	110 00
From friends of Army since statement of 1897	
From mimeograph sold	7 50
	$489 35
Balance paid by chairman	53 19
	$542 54

We feel that our work is well under way and that the most difficult point has been carried, and that we are in a far stronger position than ever. It would seem that the profession of pharmacy has been treated even more unfairly than was generally realized at first.

CIRCULAR FOR THE INFORMATION OF PERSONS DESIRING TO ENLIST IN THE HOSPITAL CORPS, U. S. N. 25½.

I. The Hospital Corps of the navy consists of the following grades and rates:

Warrant Officer.

Period.	At Sea.	On Shore Duty.	On leave or wait-orders.
First three years after date of appointment.....	$1,200	$900	$700
Second " " " "	1,300	1,000	800
Third " " " "	1,400	1,300	900
Fourth " " " "	1,600	1,300	1,000
After twelve years after date of appointment....	1,800	1,600	1,200

(*a*) Pharmacists, pay of warrant officers.

(*b*) Hospital stewards (classified as chief petty officers, special branch), $60 per month.

(*c*) Hospital apprentices, first class (classified as petty officers, third class, special branch), $30 per month.

(*d*) Hospital apprentices (classified as seamen, second class special branch), $20 per month.

II. All applications for enlistment and promotion in the hospital corps of the Navy must be addressed to the Surgeon General U. S. Navy, and should be accompanied by suitable testimonials as to character, habits, citizenship, etc.

III. A candidate applying for original enlistment should state concisely: name in full, date of birth, nativity, citizenship, general education, hospital experience (if any) and whether a graduate of a training school for nurses.

IV. The term of enlistment in the rates of hospital steward, hospital apprentice first class and hospital apprentice, is for three years.

V. No allowance will be made for traveling and other expenses attending the examination of applicants.

VI. On original enlistment, applicants for admission into the hospital corps U. S. Navy must be between the following-mentioned ages: Hospital Stewards, 21 to 30 years; Hospital Apprentices (first class), 21 to 28 years; Hospital Apprentices, 18 to 25 years.

VII. Physical and professional examinations by one or more medical officers will be required for enlistment and promotion in each of the above-mentioned grades and rates.

VIII. Appointments in the grade of pharmacists will be made from hospital stewards now in the service, and all future vacancies in said grade will be filled by selection from the list of hospital stewards. The professional examination will be largely a record examination, based upon the length of naval service and recommendations of medical officers with whom candidates have served.

IX. Hospital stewards for the present must be between twenty-one and thirty years of age. As soon as practical, they will be selected from hospital apprentices (first class), and will be required to pass a satisfactory examination on the following subjects, viz.:

1. General education, arithmetic, orthography, writing (legible and grammatical), geography, and history of the United States.

2. Professional: (*a*) Materia Medica—the botanical names, preparations and doses of the drugs recognized by the Pharmacopœia; (*b*) pharmacy—the various pharmaceutical processes employed in the manufacture of officinal and official preparations and the relative proportions of the more important drugs entering into their composition; (*c*) chemistry, chemical symbols, the formulæ of the more important officinal chemicals and the reactions produced by the combinations of chemicals; (*d*) toxicology—symptoms, doses and antidotes of poisons; (*e*) recognition of crude drugs, making ordinary pharmaceutical preparations, compounding prescriptions, and criticising prescriptions incorrect by reason of pharmaceutical or chemical incompatibility; (*f*) bandaging, minor surgery, application of splints and of dry and wet cups, and treatment of hemorrhage.

X. Hospital apprentices (first-class) must be between twenty-one and twenty-eight years of age. They will be enlisted for the present from candidates found qualified. At a later date they will be selected from hospital apprentices.

Candidates will be examined on the following subjects, viz.:

1. General education, arithmetic, orthography, writing, (legible and grammatical), geography and history of the United States.

2. Professional: (*a*) Clinical notes and preparation of temperature charts; (*b*) doses of drugs in common use; (*c*) employment of remedies other than by mouth, as poultices, enemata, counter-irritants, hydro-therapeutic agents, etc.; (*d*) names and uses of surgical instruments, and those employed in clinical diagnosis; (*e*) preparation of patients for operation, including methods of sterilizing instruments, dressings, etc.; (*f*) preliminary treatment of the more common cases of poisoning; (*g*) application of bandages and splints and the treatment of hemorrhage; (*h*) preparation of food for the sick; (*i*) preparation of beds and adjustment of clothing of patients.

XI. Hospital apprentices must be between eighteen and twenty-five years of age. Candidates will be examined in arithmetic, orthography, writing (legible and grammatical), geography, and history of the United States. Hospital training and the knowledge of nursing will be to the advantage of the applicant.

XII. No person will be enlisted or retained in the hospital corps of the navy who is addicted to the use of intoxicating liquor, or who at any time gives evidence of intemperance.

(Signed.) JNO. D. LONG, *Secretary.*

June 25, 1898.

All honor to our Naval Pharmacists who have been working under the tropics for the past three hot months in iron-clad ships, with the temperature ranging from 130 degrees F. to 160 degrees F. We congratulate them upon this advance which would have passed Congress even if the war had not broken out. It fact, at one time it looked as if the war would ruin the whole matter.

All honor to our Army and Marine Hospital Stewards who are compelled to rank as enlisted men, and yet expected to serve as professional men and never shrink from cholera, yellow fever, or other deadly diseases.

All the pharmacists in the United States Navy hereafter will be warrant officers. This will give the gentlemen who occupy these positions a considerable higher grade than the apothecaries have ever occupied in the naval service, and the whole tone of the corps will be most decidedly elevated—even the pay of the second class apprentices being considerably higher than that of the ordinary private.

We wish to heartily thank in the name of the American Pharmaceutical Association, each and every one who aided us in this work for the professional advancement of pharmacy. We trust that every State will bear in precious remembrance the hearty and energetic work of its representative on the Committee of the American Pharmaceutical Association, as without the valuable efforts which each so freely gave, in nearly every case, we would have never succeeded. The naval apothecaries themselves deserve the heartiest praise for their capable and intelligent assistance in our campaign of education. Our committee feels most deeply indebted to the various heads of the Naval Department, and to the members of Congress, who recognized the justice of our claim and aided us so substantially in our efforts. The pharmaceutical press were almost a unit in our behalf, and aided us very materially by their many appropriate and well-expressed articles on the subject. Their progressive wide-awake assistance was certainly invaluable. The daily press also assisted us in many ways, which we highly appreciate. To all who helped us we extend our hearty thanks. When what has been accomplished is summed up, and when the fact that we did not employ attorneys or other representatives at Washington is borne in mind, it is very evident that the pharmacists of the United States are a power when they care to exert themselves.

Respectfully submitted, GEORGE F. PAYNE, *Chairman.*

MR. LOWE: I think a complimentary vote is due to this Committee by the Association for the great labor they have evidently had to perform.

The question was put, and the motion prevailed by a unanimous rising vote.

The report of the Committee on Weights and Measures being next called for, Mr. Ryan, Chairman, read as follows:

To the President and Members of the American Pharmaceutical Association:

The Special Committee on Weights and Measures submit the following report:

During the past year no action has been taken by Congress on the subject of Metric System of Weights and Measures. The bill making this system the legal system in the various departments of the Government remains in the hands of the Committee on Coinage, Weights and Measures, where it was sent more than a year ago. This lack of action, as you are all aware, was caused by the attention of Congress being given to measures made necessary by the war with Spain, and to insure a successful termination of the same. Your Committee, however, are pleased to report substantial progress in the adoption and use of the Metric System by the world at large. The most important advance in its recognition is the use of the Metric System of Weights and Measures in the recently issued British Pharmacopœia; and, although the old Imperial System has also been given in this work, it is probable that the action taken is the stepping-stone to the exclusive adoption of the Metric System in future editions of this authority. In addition to this, a bill has passed both Houses of Parliament legalizing the system in Great Britain, and probably before this date has received royal assent. Russia has also made the adoption of the Metric System a certainty after a stipulated date.

It is to be regretted that our own physicians do not more generally use the Metric System in their every-day prescription writing, as was shown by a paper read by Prof. Whelpley at our last meeting; our American physicians do not take up its use as rapidly as we would expect from members of a profession so progressive in science and in investigation.

This is no doubt largely due to the fact that medical students are still taught mainly in the old system of Weights and Measures, and the difficulty they experience in adapting new terms and calculations to the dosage which they have been taught, prevents their serious consideration of the subject.

We can hope for no rapid progress in the use of the Metric System in medicine until our medical schools and colleges teach this system alone, and medical authors at least give it the preference rather than stating the equivalent in Metric terms. In view of this fact your Chairman would suggest that a resolution be passed by this Association to be presented to the American Medical Association at its next meeting to be held at Columbus, Ohio, requesting the American Medical Association to use its influence in bringing about the exclusive use of the Metric System of Weights and Measures by all colleges and schools of medicine recognized by them in the United States.

This would require only such men as are engaged in scientific instruction in teaching medicine to change their old established methods of dosage and calculations, and all students coming under their instruction would from their entrance in college know no other system of weights and measures.

In accordance with this suggestion, a resolution covering the proposition is herewith presented:

WHEREAS, The Metric System of Weights and Measures is used exclusively in the

United States Pharmacopœia, and is official in the Pharmacopœias of nearly all other nations, and

Whereas, It has become the almost universal system of Weights and Measures in scientific calculations; be it

Resolved, That the members of the American Pharmaceutical Association request the American Medical Association to use its influence with all colleges and schools of medicine recognized by them in the United States, to use exclusively the Metric System of Weights and Measures in the instruction of students, beginning with the classes entering said colleges and schools in the college year of 1900.

Respectfully submitted, F. G. RYAN, *Chairman.*

Upon motion of Dr. Stewart, the report and resolutions were received and adopted.

DR. WHELPLEY: I want to say that I have had considerable experience with the medical colleges of the United States, and their methods of teaching the metric system during the past year, and I feel that the work for the pharmacists to do at the present time is to let the physicians know that they are prepared to fill metric prescriptions. The great complaint of the physician is, that he fears his prescription may not be properly filled if he writes it in the metric system; and I move that a copy of this report be sent to each one of the medical colleges in the United States. This will show them what we are doing, and that we are ahead of them in our efforts to introduce the metric system.

The motion was carried.

THE PRESIDENT: We will now have the report of the Committee on National Formulary, Prof. Diehl, Chairman.

MR. DIEHL: Mr. President, the report I have to present is not a very large one; but there are several recommendations that I, as Chairman, have seen fit to make, inasmuch as I have not been able to consult the members of the committee and none of them are present. There are several recommendations in this that will probably invite discussion, and I question whether it will be proper to read it at this meeting. I should like to have the report read, however, at a convenient time.

Mr. Mayo moved to read by title only, and refer the report to the Scientific Section, and it was so ordered.

THE PRESIDENT: Now we come to some very important, some very interesting matters. We will have the report of the Delegates to the National Wholesale Druggists' Association at this time. Mr. Thompson, of Washington, D. C., is the chairman of that delegation.

Mr. Thompson read the report as follows:

To the American Pharmaceutical Association:

Your Delegates to the Twenty-third Annual Convention of the National Wholesale Druggists' Association held in the city of Richmond, Va,, on October 11–15, 1897, have the honor to report that of thed elegates Messrs. T. Roberts Baker, T. A. Miller and W. S. Thompson, were present.

Your delegates were most cordially received by the Convention and invited to seats on the floor, with the privilege of participating in the debate. In addition to the American Pharmaceutical Association, the Virginia, Illinois, Pennsylvania, Georgia and Michigan Pharmaceutical Associations had delegates present.

Of the 176 members in attendance New York furnished 57; twenty-two other States and the District of Columbia the remainder. The 176 gentlemen mentioned were accompanied by 89 ladies.

President Purcell presided. His address, which was greatly commended for both its presentation of matters of interest and its eloquence, gave a concise review of the condition of the Association and the work of its committees. It appeared that during the year there was not a single resignation; and while the Convention was called on to mourn the death of 19 members, there was not a corresponding loss in membership, as in most cases the membership is held by firms or corporations, which are continued after the death of a partner or incorporator.

The work of the Association is mainly done by its committees, whose reports are read and referred to the Board of Control, which subsequently refers them back with such comments as are pertinent, when the subject of the report is open for discussion. The committees and Board of Control seemed to be in harmony, and both to enjoy the confidence of the Convention; consequently the recommendations made by them were adopted without contention, especially as to the main questions. The subject of cut rates received a good share of attention, and the listener might easily fancy he was hearing the oratory of the leaders in our Commercial Section, and it is only just to say that our debaters are as far from a solution of the vexed question as are our friends in the National Wholesale Druggists' Association. There can be no doubt as to the sincerity and anxiety of the proprietors in the National Wholesale Druggists' Association to adopt any measure that promises to abolish cut-rates, and which at the same time will receive the support of the retail trade, but this support it must have.

The delegates from Michigan, Messrs. Sourwine and Anderson, presented a new scheme for the maintenance of uniform retail prices. It provides for a guaranty label to be placed on each package at the time of sale. These labels are only to be had by registered pharmacists, where the law provides for such, and then only when they have taken an oath to maintain a fixed price. The scheme was discussed and referred to the Committee on Proprietary Goods.

The Committee on Proprietary Goods, in its annual report, speaks encouragingly of a plan now in successful operation in a part of Great Britain for the maintenance of standard prices. The Committee do not give the details. Its salient feature appears to have been the combination of retailers in a unanimous demand on the proprietors and jobbers, who were thus compelled to yield to their wishes, with the result of establishing standard prices, which, though in many instances less than the original retail prices, are still a great improvemeat over cutters' rates.

A number of retail druggists of Richmond joined in a petition to the Proprietors' Association, asking them to establish one price for their goods to all retailers, regardless of the quantity purchased, and promising that such uniform rates would greatly tend to abate the nuisance of selling goods without profit. The petition was favorably commended to the proprietors for their individual action.

The next meeting of the Convention will be held in Saint Louis, Mo., in October of the present year, and will be presided over by Mr. Charles F. Weller, Omaha, Nebraska.

August 1, 1898. W. S. THOMPSON, *Chairman.*

The report was received and referred for publication.

The next report called for was that of Delegates to American Medical Association, the Chair remarking that Mr. Alpers, of New York, was the chairman of that committee, but was unable to attend the convention, and was succeeded by Mr. Ford, of Denver, who was not present.

MR. ALPERS: I am sorry to say I cannot give any report. When Mr. Ford was appointed chairman I forwarded all the papers to him, and I have never heard from him. I am not in possession of any papers relating to that convention, nor do I know what has been done.

DR. STEWART: There is a short report in the report of the Committee on National Legislation that covers their action, I think.

A report from the delegates to the National Food and Drug Congress was called for.

MR. REDSECKER: As a member of the Committee on Legislation, I went to that meeting, and, as Mr. Thompson here will bear me out, at the first session the farmers seemed to have things all their own way. But the druggists got together and organized themselves into a separate body, and determined on what they wanted, and the papers stated we were the best organized body in the whole meeting—and we got what we wanted exactly, as contained briefly in the report of the Committee on Legislation. We had stricken out that section providing for an Agricultural Department Chemist, and had inserted a pharmaceutical chemist, and also had it adopted that the U. S. Pharmacopœia and National Formulary should be regarded as standards of purity—these works were recognized as official publications and as standard; and a lot of other things that we regarded as derogatory to the pharmaceutical profession and trade we had stricken from the bill; and we went away greatly gratified, because we got everything we contended for. (Applause.)

THE PRESIDENT: It seems to me this is a very important matter, and from the success attending the efforts of the committee, I feel that I must request the committee to put in form a report, which should be published in our Proceedings. It certainly is encouraging and helpful when such good results can be obtained, and I don't think we should be satisfied with a mere verbal report. Therefore, I shall ask Mr. Thompson to be responsible for a formal report, to be ready for the printer.

REPORT OF THE DELEGATES TO THE NATIONAL FOOD AND DRUG CONGRESS.

To the American Pharmaceutical Association:

In response to a call issued January 18, 1898, for a Pure Food and Drug Congress, your President, Mr. H. M. Whitney, appointed the undersigned delegates to represent the American Pharmaceutical Association.

The Congress was held in the city of Washington, on March 2d, 3d, 4th and 5th of this year.

Delegates were present from thirty-two States and the District of Columbia, and embraced quite a number of pharmacists.

The main object of the Congress was to obtain such legislation by the Congress of the United States as would secure a uniform law affecting the manufacture and sale of food and drugs throughout the entire country. This was presented to the Congress in Bill H. R. 5441, better known as the Brosius Bill.

For convenience of action and better consideration of the subject, the pharmacists in attendance were gotten together in order that they might act on that portion of the proposed law which related particularly to drugs and medicines. Such amendments as in their judgment the bill needed were formulated and presented in the open Congress, and were all adopted.

The general scope of the proposed law seeks rather to compel manufacturers to honestly label their products than to make only pure goods. If the manufacturer add any foreign substance or adulterant to his product, he shall so state on the label, in order that the purchaser may not be defrauded. If the consumer prefers his spices adulterated with beans, his syrup made of glucose, and his whiskey diluted with water, he can have them and have them knowingly, because their labels must state the adulteration or impurity.

The retailer is not liable for any infraction of this section of the proposed law, provided the illegal article is sold in the original package, and bears an official label In such cases, the penalty is laid on the manufacturer.

Altogether, your delegation believes the proposed law to be a good one along the lines of good morals and common honesty, and so far as it relates to drugs and medicines, should have the hearty support of our Association.

The Congress elected Hon. Joseph E. Blackburn, pharmacist, of Ohio, President, and the pharmacists were well represented on all the Committees.

The bill, as agreed on, was presented in the House and Senate, referred to apppropriate Committees, but was not reported back to either House. Its passage will be again urged this winter.

The next meeting of the Pure Food and Drug Congress will be held in Washington, on January 18th, 1899.

Respectfully submitted,

W. S. THOMPSON,
ALBERT E. EBERT,
J. F. PATTON,
CHAS. E. DOHME,
T. A. MILLER.

Mr. Sheppard announced that the Committee on President's Address was ready to report.

Upon request of the chair, Dr. Whelpley then read said report as follows:

REPORT OF THE COMMITTEE ON THE PRESIDENT'S ADDRESS.

Your Committee fully realize the significance of the President's extended and well put reference to the financial condition of the retail druggists, and its influence on the growth of our membership. This Association certainly should manifest much more interest in its Commercial Section. We recommend that the said Section take some definite action at its coming meeting to help the retail druggists.

In order to carry out the President's ideas on this subject, we suggest that the Commercial Section consider the advisability of introducing into the National Formulary recipes for popular remedies, such as cough cures, etc. Thus helping the retailer by furnishing semi-official formulas for household remedies.

We heartily concur with the President's suggestion to publish the National Formulary as an appendix to the 1900 United States Pharmacopœia, and have the two works bound in one volume by the Revision Committee. We recommend that the Association take action to that effect.

We commend the President's suggestion to have the Proceedings of this Association published each year as promptly after the meeting as possible. We recommend that the President be requested to submit his plan to the Council.

We recommend that this Association define its position sharply, and discourage all efforts in the direction of a national pharmacy law as being impracticable. The American Pharmaceutical Association, however, should support the movement for a model law to be taken as a standard for the several states and territories.

H. M. WHELPLEY,
W. S. THOMPSON,
S. A. D. SHEPPARD.

Dr. Stewart moved the reception and adoption of the report, and the motion prevailed.

THE PRESIDENT: Incidental business is next in order.

MR. THOMPSON: I have the report here of the Chairman of the Council on the Invested Funds of the Association, which I might read now if there is no objection.

Leave was granted, and the report was read as follows:

REPORT OF THE CHAIRMAN OF THE COUNCIL ON THE FUNDS OF THE ASSOCIATION.

The investments and cash belonging to the several funds of the Association, in possession of the Chairman of the Council, at the close of the fiscal year, June 30, 1898, consist of

Ebert Fund.

U. S. Registered 4 per cent. bond, No. 160,603	$100 00	
" " " " " 67,880	500 00	
" " " " " 2,125	100 00	
		$700 00
Cash in bank at last report	$59 19	
Received during the year for interest and bank dividend	29 54	
	$88 73	
September 25, 1897. Paid Treasurer's draft	28 00	
June 30, 1898. Balance in Strafford Savings Bank, Dover, N. H.		$60 73

Centennial Fund.

U. S. Registered 4 per cent. bond, No. 145,640	$1,000 00	
" " " " " 160,604	100 00	
" " " " " 2,126	100 00	
" " " " " 2,127	100 00	
		$1,300 00
Cash in bank at last report	$92 50	
Received during the year from interest and bank dividend	55 08	
Balance in Strafford Savings Bank, Dover, N. H., June 30, 1898		$147 58

Life Membership Fund.

Ten (10) U. S. Registered 4 per cent. bonds, each for $1,000 (Nos. 145,639, 145,671, 145,672, 150,826, 150,827, 150,828, 164,185, 164,889, 173,049, 185,893)		$10,000 00
Cash in bank at last report	$743 43	
Received during the year for interest and bank dividend	425 26	
Received, October 27, 1897, Fee of Chas. E. Coombs	75 00	
Received, April 4, 1898, Fee of Clay W. Holmes	30 00	
		$1,273 69

General Fund.

Six (6) American Security & Trust Co.'s 4 per cent. debenture bonds, each for $500 (Nos. 94, 95, 96, 97, 98 and 99)		$3,000 00

The interest on these bonds is paid to the Treasurer of the Association.

All the above securities are given at their face value only. All interest paid to date.

W. S. THOMPSON, *Chairman of Council.*

WASHINGTON, D. C., *June* 30, 1898.

Upon motion of Mr. Kennedy, the report was received and ordered to take the usual course.

MR. KENNEDY: I now move that the gentlemen whose names were proposed for membership at the beginning of this session, the list having been duly posted, be invited to become members of this Association.

The motion was seconded by Mr. Simpson and carried.

THE SECRETARY: I have some communications here that should go before the Association. One is from the western druggists, inviting the members of the American Pharmaceutical Association to be present at the coming meeting of the Trans-Mississippi Retail Druggists' Congress, at Omaha, September 6th, 7th and 8th. and treating at length of the advantages of this congress, giving a list of prizes to be awarded, etc. It is signed by Mr. Kuhn, one of our members, as chairman. The other is a communication from the Indiana Pharmaceutical Association, requesting to have brought before this body certain resolutions adopted by the Indiana Association in special session, August 10th. They hope to merit a favorable response from us. The two circulars are wholly of a commercial character.

MR. MAYO: I move that they be referred to the Commercial Section.

And it was so ordered.

There appearing no further business before the Association at this session, upon motion the convention adjourned unitl 8 p. m.

THIRD SESSION—TUESDAY EVENING, AUGUST 30, 1898.

No business was transacted by the Association previous to the session of the Section on Commercial Interests.

FOURTH SESSION—WEDNESDAY MORNING, AUGUST 31, 1898.

The fourth session was held at 9:50 a. m., previous to the first session of the Section on Scientific Papers, President Whitney in the chair.

The minutes of the Council were read and approved.

FOURTH SESSION OF THE COUNCIL—AUGUST 31, 1898.

Council convened at Lehmann's Hall, Baltimore, at 9 o'clock, with the following members present: Messrs. Whitney, Mayo, Kremers, Sheppard, Kennedy, Remington, Beal, Gordon and Diehl.

In the absence of Chairman Thompson, on motion of Geo. W. Kennedy, the Chair was occupied by H. M. Whitney.

The minutes of the Third Session were read and approved.

Five names were proposed for membership. On motion they were accepted and recommended to the Association.

Chairman Thompson arrived and took the Chair.

S. A. D. Sheppard offered the following amendment to the By-Laws of the Council, viz.: that the word "immediately" be struck out in the second line of Chap. I, Art. II.

H. M. Whitney moved that no disposition be made of Friday night until the Commercial Section decide whether they desire a meeting at that time. This motion was carried.

The following unfinished business which was laid over at a previous session was taken up:

To the Members of the Council of the American Pharmaceutical Association:

Gentlemen: I have personally so many times waited impatiently for the Proceedings, and have so often heard complaints, I felt it was my duty to give the matter attention.

I have no fault to find with any one or more persons. My only purpose is to increase the interest and usefulness of this Association. I have a few letters which will give an expression of opinion upon this matter.

As it appears to me, the only action required is simple, and should be taken at once. I offer the following:

WHEREAS, The By-Laws clearly place the responsibility of publishing and distributing the annual Proceedings upon the Council, and

Whereas, Much complaint has been made of the delay in publishing and issuing the same, and believing the delay can and should be avoided in the future, we, the Council of the American Pharmaceutical Association, do hereby call attention to the rules governing the Association, requesting compliance therewith; and direct that the Secretaries of the several Sections shall on or before the last Session of each and every Annual Convention, place in the hands of the General Secretary all papers read or presented for publication, with such minutes of the Session as have been made, ready for the printer. Upon every paper, report or minute intended for publication, shall be written the words "approved for publication," and signed by the Secretary. Report on the Progress of Pharmacy, Report of Secretary of Council, and any report, statement, or request designed for publication, must be in the hands of the General Secretary within 14 days of the adjournment of the Convention. The General Secretary is instructed to place all in the hands of the printer at once. No paper, report or document not received as before stated, shall be permitted to delay the printing and issuing of the Proceedings, but shall be returned to the writer or laid over for the next Annual Proceedings as deemed best by the Committee on Publication. To enable the General Secretary to carry out the demand for the issue of the Proceedings in 60 days from the adjournment of the Convention, the sum of $500, or so much of it as may be required, shall be appropriated for reading, correcting proof, and such assistance as he may require in having Proceedings in hands of members inside of 70 days of adjournment.

As it is possible there may be a difficulty in accomplishing this during the present year, the time may be extended to 90 days for the 1898 issue.

The above was presented by H. M. Whitney.

On motion of J. P. Remington, the above was accepted and recommendations adopted.

Report of the Committee on the "Hager Memorial" was presented by J. H. Beal.

On motion of Geo. W. Kennedy, the report was received, and action deferred to a subsequent session.

On motion, Council adjourned. GEO. W. KENNEDY, *Secretary.*

Two names presented for membership by the Council were favorably acted upon.

Dr. Stewart called attention to the fact that the Committee on President's Address at the time that Prof. J. U. Lloyd was President twelve years ago had never reported, and suggested that in the interval, all the things recommended in that address had shown their necessity. Inasmuch as some members of the old committee had died, he moved the appointment of a new committee, to report on this address next year. The motion prevailed, and the chair appointed Messrs. Albert E. Ebert, of Chicago; F. E. Stewart, of New York, and H. M. Whelpley, of St. Louis.

The session then adjourned.

FIFTH SESSION—THURSDAY MORNING, SEPTEMBER 1, 1898.

The Association was called to order by President Whitney at 9:45 a. m.

Geo. W. Kennedy, Secretary of Council, read the minutes of the fifth and sixth sessions of that body, and on motion they were approved as read.

FIFTH SESSION OF THE COUNCIL—AUGUST 31, 1898.

Council convened at 11:30 a. m., at Lehmann's Hall, Baltimore, with the following members present; Messrs. Kremers, Remington, Diehl, Beal, Whitney, Kennedy and Thompson. Chairman Thompson presided.

The minutes of the fourth session were read and adopted.

Amendment to by-laws proposed at last session was read and adopted.

Two names were proposed for membership. On motion of G. W. Kennedy, they were directed to take the usual course.

On motion Council adjourned. GEO. W. KENNEDY, *Secretary.*

SIXTH SESSION OF THE COUNCIL, SEPTEMBER 1, 1898.

Council convened at Lehmann's Hall, Baltimore, at 9 o'clock a. m.

In the absence of the Chairman, H. M. Whitney, on motion of S. A. D. Sheppard, was called to preside.

On motion of J. H. Beal, the reading of the Minutes of the Fifth Session was dispensed with.

Lewis C. Hopp, of Cleveland, Ohio, was nominated and elected Local Secretary for the next annual meeting.

Chairman Thompson arrived and took the Chair.

Two names were proposed for membership. On motion, they were directed to take the usual course.

Chas. E. Dohme made a motion, seconded by Geo. C. Bartells, that the Council request J. U. Lloyd to aid the Committee on Semi-Centennial Celebration, especially in regard to issuing any publication relating thereto. This motion was carried.

On motion of S. A. D. Sheppard, the General Secretary was given permission to have 15 additional bars made for use at the Baltimore meeting.

J. H. Beal moved that a Committee of one be appointed to codify the rules and regulations not embraced in the By-Laws of the Association.

Chairman Thompson appointed on this Committee of one J. H. Beal.

J. H. Beal presented the following modified report of the Committee on the "Hager Memorial Prize, which had been laid over at a previous session:

SAINT LOUIS, *August* 8, 1898.

PROF. J. H. BEAL, *Chairman Section on Education and Legislation American Pharmaceutical Association:*

Dear Sir: Your Committee appointed to consider "the feasibility of the creation of some sort of memorial of Hermann Hager," beg leave to report that they are heartily in favor of the proposed action, and consider it entirely practicable. Of the several suggestions which have been made, the members of the Committee are most favorably impressed with the one recommending that his name be linked with one of the Association prizes.

They are agreed, therefore, upon recommending that a new prize of $50.00 be established, to be known as the "Hermann Hager Memorial Prize," and that in bestowing it, preference shall be given to contributions on pharmaceutical science or art, as distinguished from those on allied branches, though it shall not be confined to such; said prize to be bestowed only when, in the opinion of the Committee on General Prizes, a contribution shall be deemed worthy of the award.

Respectfully submitted,
J. M. Good,
C. S. N. Hallberg,
V. Coblentz.

On motion of S. A. D. Sheppard, the amended report was adopted.

It is moved by Chas. Caspari, Jr., and seconded by S. A. D. Sheppard, that a special prize of fifty dollars, to be known as the "John M. Maisch Prize," be established by the American Pharmaceutical Association. The prize shall be awarded for research work in pharmacognosy, and only on the recommendation of the Committee on General Prizes.

The above was unanimously adopted.

In order to establish uniformity in the value of the prizes offered by the Association, H. M. Whitney moved that the resolution of August 15, 1893, governing the general prizes, be amended to read "aggregating the sum of $100, and apportioned as follows: 1st prize, $50.00; 2d prize, $30.00; 3d prize, $20.00." This motion was carried.

It is moved by H. M. Whitney, seconded by J. P. Remington, to amend Article I., Chapter III., of By-Laws of Council, by striking out in the last sentence the figures "50" and inserting in place thereof, the figures "150," thereby increasing the salary of Secretary of Council from $50.00 to $150.00.

This was laid over under the rules.

S. A. D. Sheppard presented the following resolution:

Resolved, That no one of the three general Association prizes shall be awarded to the writer of a paper for which either the "John M. Maisch" prize or the "Hermann Hager" prize has been given.

This resolution was adopted.

On motion, Council adjourned. Geo. W. Kennedy, *Secretary.*

On motion the Association adjourned to allow the Section on Scientific Papers to hold its second session.

Sixth Session—Thursday Afternoon, September 1, 1898.

No business was transacted by the Association previous to the third session of the Section on Scientific Papers.

Seventh Session—Friday Morning, September 2, 1898.

The Association was convened by President Whitney at 9:45 a. m., immediately preceding the first session of the Section on Pharmaceutical Education and Legislation.

The President announced that some important matters had been passed upon by the Council, which demanded the action of the Association, and would be presented by Mr. Sheppard.

Mr. Sheppard said that, at the first session on Monday, there were presented two proposed amendments to the By-Laws, recommended by the Council—the first being to strike out the last sentence of Article V., Chapter VI. of the By-Laws, "The Secretary may or may not be a member of the Council." Mr. Sheppard explained that this should have been done two or three years ago, when the Secretary was made one of the Council—the Council was increased in number to twenty-one—which was merely an oversight. He, therefore, moved that this proposed amendment be adopted. The motion was seconded and carried.

Mr. Sheppard said that the other proposed amendment was in regard to the Committee on Transportation, and was to add, in Article IX, Chapter IX of the By-Laws, after the word " with " in the 4th line, the words " the General Secretary and," and to strike out the words " a member " in the same line and insert in lieu thereof the word " members ;" also strike out the last sentence of the Article, and insert in place thereof the words, " The Council shall annually elect the Chairman of this Committee," so that the whole Article will read as follows:

Article IX.—The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul or Minneapolis, Denver and San Francisco, and in conjunction with the General Secretary and the Local Secretary, who shall be members of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. The Council shall annually elect the Chairman of this Committee.

Upon motion of Mr. Sheppard, seconded by Mr. Remington, the proposed amendments to this article were adopted.

Mr. Kennedy read the minutes of the first session of the new Council, and Mr. Alpers moved their approval and adoption. Carried.

FIRST SESSION OF THE NEW COUNCIL—SEPTEMBER 2, 1898.

Council assembled at Lehmann's Hall, Baltimore, at 9 o'clock a. m., for the purpose of re-organization, with the following members present: Messrs. Whitney, Thompson, Caspari, Kennedy, Main, Hopp, Sheppard, Rapelye, Beal, Mayo, and Miss Wanous.

Temporary organization was secured by the election of H. M. Whitney, Chairman, and Geo. W. Kennedy, Secretary.

S. A. D. Sheppard nominated W. S. Thompson for Chairman. On motion, the nomination was closed, and he was elected by S. A. D. Sheppard casting an affirmative ballot as instructed.

For the office of Vice-Chairman, James M. Good was nominated, and there being no opposition, he was elected by the Secretary casting an affirmative ballot in compliance with instructions.

For Secretary, Geo. W. Kennedy was nominated, and being the only nominee, he was elected by S. A. D. Sheppard casting an affirmative vote as requested.

The chair appointed Chas. Caspari, Jr., a committee of one to conduct the newly elected Chairman to his official seat. In a neat speech, Mr. Thompson thanked the Council for the honor.

The following Committees were nominated:

Committee on Membership—Wm. A. Frost, H. M. Whitney, Jos. Jacobs, John Ingalls, Lewis C. Hopp, Miss Josie Wanous. Chas. A. Rapelye, Treasurer and General Secretary, members *ex-officio*, and Geo. W. Kennedy.

Committee on Finance: Jos. P. Remington, Thos. F. Main, James H. Beal.

Committee on Publication: C. L. Diehl, James M. Good, H. H. Rusby, Caswell A. Mayo, A. B. Lyons, Geo. F. Payne, Chas. Caspari, Jr.

On motion of H. M. Whitney, the Secretary was instructed to cast an affirmative ballot for their election. This having been complied with, the Chair declared them duly elected.

Committee on Centennial Fund. This is provided for in the By-laws of Council, and is composed of the following: Chas. E. Dohme, Jos. P. Remington, Chas. Caspari, Jr.

Auditing Committee. The Chairman appointed the following members to serve for the year 1898–1899: James H. Beal, of Scio, O., Geo. L. Heckler, of Cleveland, O., Geo. W. Voss, of Cleveland, O.

On motion of Thos. F. Main, Council took a recess of three minutes to allow the various committees time to select their chairmen.

On reassembling, the committees announced their choice as follows:

Committee on Membership: H. M. Whitney, Chairman, Geo. W. Kennedy, Secretary.

Committee on Finance: Jos. P. Remington.

Committee on Publication: Chas. Caspari, Jr.

Amendment to Art. I., Chapt. III., of the By-laws of the Council proposed at last session, was taken up and adopted.

Three names were proposed for membership. On motion of Geo. W. Kennedy they were approved and directed to take the usual course.

Thos. F. Main offered the following resolution, which was seconded by S. A. D. Sheppard, and adopted:

Resolved, That if deemed expedient by the Publication Committee, portraits of A. B. Taylor and M. W. Alexander, ex-presidents of the Association, shall be published in the next volume of our Proceedings, with foot-notes embodying their ages, dates on which they became members, and when they served as president of the Association, with references to pages on which their full obituary notices are to be found.

On motion of H. M. Whitney, the General Secretary was instructed to procure designs for certificates for honorary and life members, to report next year.

Chas. Caspari, Jr., made the following motion, which was seconded by S. A. D. Sheppard, and which was adopted: that the sum of $25,00 be added to the appropriation for Section on Education and Legislation,

On motion, Council adjourned. GEO. W. KENNEDY, *Secretary.*

The names of three applicants for membership were presented from the Council, and upon motion of Mr. Kennedy, these gentlemen were invited to become members of this Association.

Upon motion of Mr. Sheppard, the Convention adjourned.

EIGHTH SESSION—FRIDAY AFTERNOON, SEPTEMBER 2, 1898.

No business was transacted by the Association previous to the second session of the Section on Pharmaceutical Education and Legislation.

NINTH SESSION—SATURDAY MORNING, SEPTEMBER 3, 1898.

The ninth session was held at 10 o'clock a. m., immediately before the third session of the Section on Pharmaceutical Education and Legislation, President Whitney in the chair.

The minutes of Council were read by the Secretary, G. W. Kennedy, and upon motion, approved.

SECOND SESSION OF THE COUNCIL—SEPTEMBER 3, 1898.

Council was called to order by Chairman Thompson, at Lehmann's Hall, at 9 o'clock a. m. The following members were present: Messrs. Remington, Kennedy, Dohme, Caspari, Hynson, Whitney, Sheppard, Beal, Main, Payne and Ingalls.

On motion of H. M. Whitney, the reading of the minutes of the last session was dispensed with.

H. P. Hynson offered the following resolution, which was adopted:

Resolved, That the Council advise the formation of a Committee on Practical Pharmacy and Dispensing, and recommend that the Council be authorized to devote so much of a general session of the next meeting as may be necessary to receive the report of this committee and the matter it may present; and that it be also recommended that the sum of fifty dollars be appropriated for the uses of this committee.

On motion, H. P. Hynson was made the chairman of the above committee.

S. A. D. Sheppard offered the following resolution, which was adopted:

Resolved, That Prof. Beal, Prof. Remington and Prof. Diehl be appointed a committee to consider the advisability of dividing the work now done by the Reporter on the Progress of Pharmacy, the committee to report at the next annual meeting.

Two names were proposed for membership. On motion, they were directed to take the regular course.

Geo. F. Payne offered a motion that the Committee on the Status of the Apothecaries of the Army, Navy and Marine Hospital Service be continued, and that an appropriation of $150 be made to defray expenses of the committee of last year and of the new committee. This motion was duly seconded and carried.

On motion of S. A. D. Sheppard, the Transportation Committee was nominated and elected, and is constituted as follows:

C. A. Mayo, New York; A. K. Finlay, New Orleans; A. E. Ebert, Chicago; Chas. M. Ford, Denver; W. J. M. Gordon, Cincinnati; Harry Sharp, Atlanta; S. A. D. Sheppard, Boston; Wm. M. Searby, San Francisco; H. M. Whelpley, St. Louis; C. T. Heller, St. Paul; L. C. Hopp, Cleveland; Chas. Caspari, Jr., Baltimore. A. E. Ebert was nominated and elected chairman for next year.

On motion, Council adjourned. GEO. W. KENNEDY, *Secretary.*

The names recommended by the Council for membership were presented, and the Association voted to receive them.

Mr. Kennedy, Secretary of the Council, remarked that this made eighty-six applicants, with three or four more to come in as delegates, making, say, ninety in all.

Upon motion, the convention adjourned.

TENTH SESSION—SATURDAY AFTERNOON, SEPTEMBER 3, 1898.

President Whitney called the Convention to order at 3 p. m.

The Secretary read the minutes of the second general session.

Upon motion of Mr. Kennedy, the minutes as read were adopted.

THE PRESIDENT: I suppose it would be proper at this time, before the installation of officers, to hear any unfinished business reported.

THE SECRETARY: There is a report due from the special committee on the recommendation contained in the report on National Legislation. Mr. Thompson is Chairman of that Committee.

Mr. Thompson read the report as follows:

Your Committee, after due consideration of the able report submitted by the Special Committee on National Legislation through its Chairman, begs leave to urge upon the American Pharmaceutical Association the following course of action:

1. The continuance of this Committee as at present constituted for the further prosecution of the work so intelligently begun.

2. The appointment of a Special Committee on Nomenclature, to co-operate with a similar Committee as appointed by the Section on Pharmacy, Materia Medica and Therapeutics of the American Medical Association.

3. The adoption of the following resolutions:

WHEREAS, The American Pharmaceutical Association is keenly mindful of the abuses engendered by the lax and indulgent patent laws of the United States, rendering possible the exploitation of the public, the medical profession and the drug trade; and,

Whereas, Special privileges and monopolies are freely granted by our patent officials to foreign inventors who could not possibly obtain such concessions in their own countries; and,

Whereas, The granting of perpetual monopolies in registered or trade-marked names is a source of peculiar burden to, and imposition upon, the American public; therefore, be it

Resolved, That this Association approves and supports the position of its Special Committee on National Legislation in respect to trade-marks and patents; that it protests against the granting of patents on medicinal substances *as such*: that it regards as inimical to justice, to the progress of science, and to public policy, the creation of perpetual property in the names or appellations of medicines; and that it invites the assistance of the Commission on United States Patent and Trade-Mark Laws, recently appointed by President McKinley, in the effort to mitigate and remove existing abuses.

Resolved, That a copy of these resolutions be sent to each Commissioner, together with a copy of Dr. Stewart's report.

W. S. THOMPSON,
A. J. CORNING,
WILLIAM MCINTYRE.

Mr. Sheppard moved to receive the report. Carried.

DR. WHELPLEY: Would it not be much more effective if a committee were appointed to call on the Commissioner and argue the case? We may pass these resolutions and send copies of them, but generally that is a nice way of getting rid of a subject without really accomplishing anything. I do not wish to insinuate that, in this case, nothing would be accomplished; it may be that there would. I am referring to the general effect of such action.

THE PRESIDENT: A motion to appoint a committee to carry out this work would be in order, if desired.

THE SECRETARY: The resolution, I believe, says the General Secretary shall send a copy of these resolutions and a copy of the report shall be sent to the commissioners.

THE PRESIDENT: Is there any other report?

Mr. Thompson: I have a report on the suggestions of the Committee on National Formulary, if it is in order, and would like to say in explanation that when Prof. Diehl presented this report on National Formulary at the general session of the Association, it was read by title only, and referred to the Scientific Section. When it was read before that Section, it was discovered that the recommendations were entirely of a business nature, and involved the expenditure of money, something the Scientific Section had no jurisdiction over; so it referred it to your committee with instructions to report back to the General Association.

Mr. Thompson, with this explanation, then read the report as follows:

The undersigned Committee, to whom was referred, by the Scientific Section, the report of the Committee on the National Formulary, with instructions to report to the general session of the Association, in compliance therewith beg leave to say that they have considered the recommendations contained in the report on the National Formulary, and would submit for the adoption by the Association the following resolution: That the Council be and is hereby authorized to publish an epitome of the National Formulary, in such quantities as in their judgment may be required, and to fix the price.

Wm. S. Thompson,
C. B. Lowe,
W. L. Scoville.

Upon motion of Mr. Eliel, the report was ordered received and the recommendations approved.

Mr. Remington then submitted a paper on the Eighth International Pharmaceutical Congress, held in Brussels, beginning August 14, 1897, to which he was a delegate from the United States Government, upon the recommendation of this Association. The reading of the paper, with Prof. Remington's comments upon the work of the Congress and the position of the American delegates before it, elicited the applause of the meeting.

THE INTERNATIONAL PHARMACOPŒIA.

BY JOSEPH P. REMINGTON.

To the American Pharmaceutical Association:

Gentlemen: At the instance of this Association, Secretary of State John Sherman appointed two delegates to represent the United States at the Eighth International Pharmaceutical Congress which met at Brussels, Belgium, August 14, 1897. The action of this Congress has been fully reported in the pharmaceutical journals, and need not be recounted at this time. An official report, setting forth the acts of the Congress and the action of the delegates having been forwarded by the delegates to the Secretary of State, it might be considered unnecessary for a special report to be presented at this time to a meeting of this Association; but in view of the great interest taken by this body in International Congresses, and of the fact that the American Pharmaceutical Association has shown its appreciation of an International Pharmacopœia, it has been deemed proper to bring before you such acts of the Eighth Congress as may be of special importance.

Owing to the illness of Mr. Louis Dohme, one of the delegates, his place was taken by Mr. Alfred Meyer (alternate), of New Orleans. Dr. F. B. Power, the other alternate, was also present at the Brussels Congress.

The Secretary-General, M. Maurice Duyk, has just forwarded a copy of the Proceedings of the Congress, and I have the honor of presenting it to this Association with his compliments and felicitations.

The most important action of interest to this body is the decision of the Eighth Congress in relation to the International Pharmacopœia. This can best be shown by appending a translation from its official Proceedings:

"*The President:* Before going any further in this discussion, I wish to express in the name of the entire Congress, our sincere thanks to the American Pharmaceutical Association for the princely gift it has so freely given to aid in the publication of an International Pharmacopœia. I beg Professor Remington to transmit these thanks to the the President and members of this powerful Association of the New Word. [Prolonged applause.]

"*Mr. Remington* replied, thanking the Congress for the good words pronounced by the President.

"*M. Petit* (of Paris): For a long time the question of a universal pharmacopœia has been studied, and in the different congresses, and at several times, various committees have been formed. I have been on one of these committees, and have stated that the labors have not been completed. However, a large number of the members of this Commission have done considerable work. To succeed, it is necessary that the Commission, of which Mr. Remington has spoken to us, take action. It is necessary that they take such measures that the work cannot be interrupted. In my opinion, the Chicago Congress, instead of advancing the work, has retarded it in this sense—that it has limited the field of action. In effect the new Commission undertakes only the compilation of an International Pharmacopœia embracing only potent remedies. It would have been better, in my opinion, if they had taken a broader view of the subject, and if the above-mentioned Commission had occupied its attention with all medicines without distinction.

"The speaker (M. Petit) made a motion to this effect.

"*MM. Meyer, Wefers-Bettink, Schoepp, Schmiti, Prunier, Martin, Schalmelhout* and *Gesché* made various remarks.

"*Mr. Remington* remarked that he could not support M. Petit's motion, as the action of the Commission was limited, and he had not the authority to enlarge it.

"*M. Schoepp* would like to have the Committee undertake to publish a supplement each year.

"*M. Petit* supported this motion.

"*M. Moralès*, in a long and interesting discourse, presented several observations on the subject of the manner in which so important a question as that of an International Pharmacopœia was understood by the Congress of Chicago. With M. Petit he made the following motion:

"1st. The Committee charged with the compilation of the International Pharmacopœia should not occupy itself exclusively with potent medicines, but add to it the study of such remedies for which there is occasion to unify the preparation.

"2d. It should have the power to add an unlimited number of co-workers from different countries, and have the authority to replace those of its members who are deceased, or who from other causes cannot participate in this work.

"*M. Schoepp* proposed to add the following proposition:

"The Commission shall be permanent, and shall publish supplements as may be necessary.

"On a question from Mr. *Remington*, M. Petit explained that by this vote this congress was understood to ratify the vote passed in Chicago, and to approve the resolutions confided to the members of the Pharmacopœial Committee, and also in enlarging their powers.

"The motion of MM. Moralès and Petit with the amendment proposed by M. Schoepp was adopted by a very large majority."

It will thus be seen that the Eighth Congress expresses its hearty appreciation of, and thanks for, the action of the American Pharmaceutical Association at the Seventh Congress in appropriating $1000 for defraying a portion of the expenses of publishing an International Pharmacopœia of *potent* remedies. A difference of opinion, however, prevailed in regard to the limitation of the scope of such a pharmacopœia; the Eighth Congress recording its judgment that it should *not* be limited to "médicaments héroïques." Inasmuch as the conditions, upon which the offer of this Association was made specified that the pharmacopœia should be limited to potent remedies, a referendum reply was made by an American delegate that "we were not authorized to extend the scope of the book."

The next meeting of the Congress will probably be held in the year 1900 at Paris, and this will undoubtedly be the occasion which will draw together a larger representation than has ever before assembled at an International Congress.

In this connection it may be proper to offer, unofficially, some views on the general subject of pharmacopœias of this character.

The most valuable contributions to the sum of human knowledge made by the world's greatest thinkers and workers, have been given by talented men who have freely laid their best gifts on the holy shrine consecrated to the welfare of their fellows. It does not detract from the value of the gifts to say that such have benefited personally by their acts; they may or may not have been rewarded by the plaudits of the multitude or worldly gifts, for such men recognize as their chief impulse the intense ambition to penetrate mysteries, to unravel intricacies and to wrest from nature her most cunningly hidden secrets. The aggregate of such labors, when duly recorded, constitutes science, and its best definition becomes then that widely quoted one, "The orderly arrangement of facts." The universal acceptance of these principles throughout civilized nations in modern times, gives force to the sentiment that "Science knows no language;" and this well known aphorism might well be extended until it reads, "Science knows no language and no nation."

A pharmacopœia must ever aim to approach the highest scientific standard, and never fail to represent an "orderly arrangement of facts." A "fact" should be a "truth;" but it can never become such until it has "passed through the fire" of proof and emerged from the ordeal unscathed. This being accepted by all countries, it must be conceded that a pharmacopœia which is to be recognized as authoritative must be one which contains only such facts as have been proven to be truths, and an international pharmacopœia must necessarily accept only those which can successfully prove their character and resist all assaults. Many years have elapsed since the idea of an international pharmacopœia was first bruited. The theory and principle—that all nations of the world could be brought into accord so that an agreement could be reached, and the standard be universally accepted throughout the world—is one which is so inspiring, so filled with the elements in consonance with the natural desires of every true man, and so appealing to the lofty ideals of universal brotherhood among nations, that it would seem there could hardly be a single opponent who would seriously maintain that, in theory at least, a universal pharmacopœia was not a "consummation devoutly to be wished." The International Pharmacopœia has been, in all of the International Pharmaceutical Congresses which have ever been held, an object of overshadowing importance; for while general questions like the elevation of pharmacy, suppression of patent medicines, improvement of the pharmacists' professional and social status, limitation or non-limitation in the number of pharmacists in a given district, the relations of pharmacists to physicians, the broadening of the education and widening of the sphere of pharmacists, have been recognized as valuable and important subjects of discussion, it has always been acknowledged that the International Pharmacopœia must ever be first. And yet, in all of the Congresses, the great difficulties in securing the universal adoption of an International Pharmacopœia have always been conceded.

Since 1893 the writer has given his earnest attention to the study of this subject. Very early the conviction became a certainty, that the mere act of framing an International Pharmacopœia was the least difficult of the problems encountered; indeed, two International Pharmacopœias have been framed and presented at the Congresses, but neither was adopted. If either had been adopted, it would probably never have been accepted by the world at large; and of what use would such a work be in the world, if it were unrecognized and suffered to die an ignominious death?

Two plans for such a world's standard prominently present themselves. The first and grandest theoretically is for a book containing all of the valuable medicines used in the world, with appropriate standards to indicate the strength and purity and, if you will, the doses. Such a work could only be authoritative after receiving the approval of every government in the civilized world.

The other and less ambitious plan is for an international pharmacopœia in which the number of medicinal substances would be limited solely to such as were of large use in all countries, and were recognized as dangerous or powerful remedies. It was a work of this character that the American Pharmaceutical Association had in view when, in 1893, it pledged the sum of $1,000 to aid in defraying the expenses of publication.

The first question which naturally presents itself is this: What would be the status of national pharmacopœias in each country; would the international authority be expected to supplant the national standard? If it did not contain the valuable remedies used in each country, it would never be accepted; if, on the other hand, it contained every preparation regarded as valuable in each country, the book would be so unwieldly, voluminous, and contain so many preparations regarded as indispensable in one country but entirely unused in another country, that the complaint that one was compelled to buy a book at least half filled with formulas of preparations that were never used in his locality, would be universal from every user of the book.

On the other hand, it has been said that an international pharmacopœia need not supplant the national authority, but both could be used in the same country. The homely illustration of the lion and the lamb lying down together is here applicable, but surely the lamb must be inside the lion. It would be impossible to have two conflicting authorities in the same country; for every article found in both pharmacopœias, uniformity must rule, or great confusion, and possibly danger, arises. If two books are to be used in a country, the International Pharmacopœia must be reserved for medicines of world-wide and universal use, while the national pharmacopœias must content themselves with including only those medicines which are either secondary in importance, or have special uses in the particular country publishing the national pharmacopœia.

There are many arguments in favor of limiting the scope of an international pharmacopœia which would embrace only potent remedies. Prominent among these may be mentioned its practicality as an initial movement toward uniformity throughout the world. It would not be nearly so difficult to convince a government that poisonous preparations should have a uniform strength all over the world, because if they did not, a prescription compounded in Vienna, according to the Austrian Pharmacopœia, might cause death if compounded in San Francisco according to the United States Pharmacopœia. Or it might come closer home if we were to transfer the localities to London and Paris, or Strassburg and Berne. Then again, it would seem to be the part of wisdom to begin an international pharmacopœia with a limited number of preparations, all of which claim international recognition; the book would thus be unencumbered with preparations of doubtful utility or of merely local celebrity. Unfortunately, at the Eighth International Congress, many of the members did not favor an international pharmacopœia limited to potent remedies, but wanted a more ambitious work; in fact, a "Pharmacopée Universelle," a pharmacopœia for the whole universe. It must be admitted that this was a grand thought, but, in the writer's opinion, utterly impracticable at present. The International Pharmacopœia must come through a natural course of development and evolution. The period of agitation and discussion is passing; pharmacists and physicians are reasonably familiar with the objects of such a work. But this is not sufficient. When the governments of the great nations can be induced to move in the matter, then will there be hope; but not until then. The governments of nearly every nation in the world except our own appoint the Pharmaceutical Commissions to frame each nation's pharmacopœia. Without governmental sanction the work would be futile.

Another important element has been lacking in all previous efforts in this direction: the action of physicians and medical men throughout the world. It must be remembered that the United States is practically alone among the nations of the world in the preponderance of pharmaceutical influence in the framing of the Pharmacopœia. In other countries the influence of the physician is all-powerful. We have only to look at the British Pharmacopœia just issued; the only names which appear in the list of the Commission of Revisers are those of physicians. By this it is not meant that pharmacists have had nothing to do with the framing of the British Pharmacopœia, for Professor Attfield was at the helm as the editor, and he was ably assisted by many brother pharmacists: but the book itself is controlled absolutely by physicians appointed by the Government.

It would seem then to be wise to *first* secure from each Government, or at least from the principal Governments of the world, the appointment of Commissioners who would be clothed with the authority to accept the book officially, after the International Commission had published it.

It is not so much a question of collecting together in one book the names, characteristics, and methods of preparation of international remedies, which constitutes the difficulty, but, in the writer's opinion, the first essential is to begin with the powers in authority, and secure an International Commission having governmental support and backed by the laws of the country.

Philadelphia, August, 1898.

THE PRESIDENT: Gentlemen, as is usual with any work that Prof. Remington underakes, we have an exceedingly interesting, valuable and exhaustive report on the subject. What is your pleasure?

MR. THOMPSON: I move that the report be received and referred for publication. And in doing so I would like to remark in regard to the paper as presented by Prof. Remington, it shows a comprehensive study of the subject of an International Pharmacopœia.

But it seems to me that the adoption, or partial adoption, of an International Pharmacopœia along with a National, if that could be possible, would certainly be regretted. No country can have more than one legal standard, and even its *quasi* adoption would be fraught with difficulties, for the reason that if a retail pharmacist in one country is presented with a prescription from another—as if, for instance, a prescription written in France were presented to a druggist in South America—his first idea would be that the writer was following the Pharmacopœia of the country where it was written. If an International Pharmacopæia existed alongside a National one, he would have a doubt as to whether it should be compounded according to the National, representing the country of the writer, or the International; and I hope it will never be recommended that an International and a National Pharmacopœia shall exist at the same time. An International Pharmacopœia should be for universal strengths of medicinal preparations. If we had such, all peoples would look to that, and try to make their National Pharmacopœias come in as near in accord with this universal standard as possible.

MR. REMINGTON: This paper is simply for the information of the American Pharmaceutical Association. It is not a report. I am very glad that Mr. Thompson has expressed his views. These are exactly the views of the commissioners; in other words, that it would be a very great mistake to have an International Pharmacopœia and a National Pharmacopœia exist at the same time. This matter was discussed in Chicago in 1893. and it was the view of this Association then that any International Pharmacopœia should be limited in its scope and confined to known potent remedies. The idea would be, for instance, to agree on the strength of Fowler's solution, and put that in, and so on. Of course, the right to include any other known preparation in a National Pharmacopœia would be reserved to them. I contended hard for this view at the Brussels Congress—to have the scope of the work thus limited; but the French are a volatile people, and wanted Universal Pharmacopœia, and wanted to make all the nations of the world adopt it—and it was carried with a hurrah; but I am sure it will never be sustained.

MR. SHEPPARD: It was my privilege to take active part in the deliberations of the Congress of 1893, in regard to this matter, so I am somewhat familiar with the important points, and I agree most fully with the position taken by Prof. Remington. This Association pledged a sum not to exceed one thousand dollars to assist in the compilation of a work of this sort, limited to its practical possibilities. The question as to whether it should be a Universal Pharmacopœia or a Pharmacopœia of Potent Remedies was thoroughly considered in 1893, and the point then seemed to be well established that a work confined to the potent remedies was the only practical thing to consider—that no general pharmacopœia could be of real value, and these were the conditions under which the Association voted that money.

I would therefore move, Mr. President, the adoption of the following resolution as expressive of the sense of this Association:

Resolved, That the American Pharmaceutical Association does hereby place itself on record and define its position relative to an international pharmacopœia, namely, that the position assumed by the Seventh International Pharmaceutical Congress assembled at Chicago in 1893, is the correct one, and that an international pharmacopœia of potent remedies is the only international pharmacopœia that should be published at the present time.

MR. ALPERS: I beg leave to add an amendment, to extend the thanks of this Association to Prof. Remington for attending the Brussels Congress, and for the work he has done in this matter. I think we might well express our appreciation of his work in this behalf by such a vote.

MR. THOMPSON: I take great pleasure in seconding the motion. Prof. Remington went to this congress as the representative of the United States government; this Association merely nominated him to the government. I want it made plain that he was the representative of this country.

The motion to receive and refer for publication, and to thank Prof. Remington for his labors, was carried by a unanimous rising vote.

THE PRESIDENT: Now comes the question upon the resolution offered by Mr. Sheppard.

Mr. Thompson seconded the motion to adopt the resolution, and the motion prevailed.

Mr. Mayo offered the following resolution:

Resolved, That in view of the expansion of the territory of the United States through the brilliant victories of our Army and Navy, this Association do formally request the

President of the United States to appoint a Commissioner to make a study of the conditions existing in the territory of Hawaii, the province of Porto Rico and the islands of Cuba and Luzon, and to draft such laws for regulating the practice of pharmacy in these several islands as may seem best calculated to conserve the public welfare. And that the General Secretary of this Association communicate this request on the part of the Association to the President of the United States.

In support of this proposition it is submitted that the conditions existing in the islands named are likely to change very materially within a short period of time, and in the interim between the old and new a condition of chaos may follow unless care be taken beforehand. If this work is entrusted to a competent expert by the government, the result will undoubtedly be the formulation of laws which will in the end very materially simplify the administration of the pharmacy law in these several islands, and thereby not only prove a safeguard to the public welfare, but effect a great economy in the prevention of unnecessary litigation, such as has grown out of the patch-work pharmaceutical legislation which has been enacted in a great many of the states of the Union.

The motion to adopt the resolution was seconded by Mr. Freericks and carried.

MR. SHEPPARD: I have a matter to bring before this session. It is one rather of form than importance. We all know that there is in our By-Laws a provision for a social session at the close of our regular business sessions, the object of that session being to lengthen the life of our railroad tickets. This was put in several years ago at the suggestion of the railroads. It is necessary that our records should be made complete for reference, and, therefore, this resolution, or something similar, is offered at the end of each meeting—at the end of the business sessions:

Resolved, That the adjournment of this general session shall close the business meeting of the Association, and that the social session as arranged for by the By-Laws shall then begin.

The social session shall be in charge of the Local Secretary, and when it is closed in due form the annual meeting of this Association shall end. The Local Secretary shall make a record of the close of the meeting and send it to the General Secretary to be inserted in our minutes.

The motion to adopt the resolution was duly seconded and carried.

MR. ELIEL: I desire to offer something in connection with the matter brought up by Mr. Mayo, and that is this: We all know the deplorable condition in the army in the handling of medicinal supplies. I think it is our duty to see to it that the army pharmacist has as good a show as the navy pharmacist, and if there has not been any action taken by the American Pharmaceutical Association in connection with this matter, I should like to see it done at this meeting in the way of appointing a committee. Possibly it might be turned over to the Committee on National Legislation, and with this committee urge that something be done for the army pharmacist. I think from the way the drug supplies have been handled in the army, it will probably be an easy matter to obtain some degree of improvement over what there is now.

THE PRESIDENT: That matter, I believe, was referred to a committee last year, and some money appropriated by the Council.

DR. PAYNE: I believe with Mr. Eliel that this is an opportune time to undertake this work. I hope to have an interview with Dr. Sternberg to-night in regard to this matter. I think the general impression over the Untied States now is, that the militia will be reorganized, so that the United States Government will arm and equip it, and supply all the material of organization, but that each State's troops will be under the control of the Governor of that State, so as to prevent any concentration—but the reorganization will be from Washington. The past experience with the militia has been that it was not organized in the proper way to meet the exigencies of war.

THE PRESIDENT: It gives me a great deal of pleasure to say that in Massachusetts for several years past no hospital steward has been appointed in the volunteer militia unless he was qualified and registered; and appointments to place of this or that friend, without regard to qualification, are not tolerated there.

DR. PAYNE: Our worthy President, I think, has struck the keynote to the whole thing. If the United States medical authorities do not accord it to us, I think the boards of pharmacy throughout the country should take it up with those in charge of the militia in the various States, and fight it out with them. I have a number of suggestions to make to Dr. Sternberg—I don't know how he will receive them—along the line of securing a better organized pharmaceutical corps in the higher branches of the service of the army, preserving the hospital stewards in the battalion formation as they exist at present.

MR. SHEPPARD: I hold in my hand a resolution written out by Prof. Lowe, of Philadelphia, who was obliged to go away this morning. He asked me to present it to this convention. It is a resolution expressive of our appreciation of what has been done for us here by the pharmacists of Baltimore—our Local Secretary, Mr. Hynson, in particular (applause), and I will read it:

Be it unanimously resolved, by the American Pharmaceutical Association, that we hereby give expression to our high appreciation of the warm welcome, and most generous hospitality, extended to us by the pharmacists of Baltimore. We feel like the Queen of Sheba on her visit to King Solomon, "that the half had not been told us."

It is difficult to distinguish individuals where all have been so kind, and we do not want to seem partial in doing so, yet we think that we should mention by name the Local Secretary, Mr. Henry P. Hynson, for his indefatigable efforts in our behalf, and that the champion belt as Local Secretary, so long held by Mr. Whitney, should now be awarded him.

DR. LYONS: I desire to second the resolution offered by Mr. Sheppard. About a year ago, among many other invitations that came to us, we had an extremely urgent one from Baltimore. We came here, and Baltimore has given us entertainments of all descriptions. They have given us a scientific treat. They have shown us how air can be made liquid, and how we can be liquefied ourselves. (Laughter.) If any one of us undertakes to thank a Baltimore man, he turns around and thanks us. (Laughter.) Mr. President, with the permission of the house, I wish to put myself on record in this matter. I do feel honestly that "Admiral" Hynson is entitled to be called "General," and the only general of this convention. He has done all that man could do to make this an exceptional meeting, and I am glad to vote for this resolution.

THE PRESIDENT: Gentlemen, you have heard the motion and second, and the kind words that have been uttered, which we all feel the force of, and I want to ask that those of you who feel like honoring the noble work done by Mr. Hynson and his associates, shall give expression to it by rising.

The motion was carried by a unanimous and hearty rising vote, amid great applause.

MR. LEMBERGER: I want to speak of the services and kindness of the ladies of Baltimore—the wives and daughters of the pharmacists of Baltimore. It is a fact, Mr. President, that very much of the pleasure of this meeting is due to the cordiality and interest shown by these ladies, and I want that recognized and included in the vote of thanks that this Association is tendering. Of course we all expected something—a little more, perhaps, in Baltimore than anywhere else, for Baltimore women are proverbial for their beauty and charm of manner. They have done the handsome thing by us, and it should be handsomely recognized.

THE PRESIDENT: To show due respect to those whom we not only respect, but love, I ask you, gentlemen, to rise in response to this sentiment.

The motion was carried by a unanimous rising vote, with hearty applause.

MR. ALPERS: Our gratitude for the good things we have received here would not be complete if we did not also include in this vote those business houses and institutions of learning that have so materially assisted in making our stay in Baltimore pleasant to us. I move a vote of thanks to all of these.

The motion was unanimously carried, with applause.

The President announced that the time had come for the installation of officers, and requested Mr. W. S. Thompson, of Washington, and Mr. John F. Patton, of Pennsylvania, to conduct the President-elect, Mr. Dohme, to the Chair, and they escorted the gentleman forward amid great applause.

Mr. Thompson said:

Mr. President, I take great pleasure in presenting to you the newly elected President of the American Pharmaceutical Association, Mr. Charles E. Dohme.

The President turning to the President-elect said:

President-elect, Mr. Dohme, to be followed by you reflects credit upon every President who has preceded you. As one of our most faithful, earnest and trusted members, the Association has called you to the highest honor it can confer. In transferring to you this badge of your office, I am performing the most satisfactory duty of my official position, for I fully recognize that success always attending your efforts will attend you in correcting, so far as is possible, all errors of the past.

To you, fellow-members, I wish to say, that in the selection of Mr. Dohme you have reminded many of us of the gilded dome which crowns Massachusetts' capital on Beacon Hill, of which Boston is so proud, and as you have crowned the American Pharmaceutical Association with a royal and jeweled Dohme—several of which jewels were so aptly referred to by Mr. Lemberger, and which we have seen every day, every morning and every evening—I am sure you will be proud of his reflected power and services. I ask you to greet our President-elect with that kindness, that cordiality, which his many excellent points demand at your hands, and it gives me great pleasure to introduce to you President Charles E. Dohme. (Great applause.)

Mr. Dohme, in recognition, spoke as follows:

Mr. President, Fellow Members of the American Pharmaceutical Association, Ladies and Gentlemen:

Let me thank you most sincerely for the honor conferred upon me by selecting me as your presiding officer for the ensuing year.

Whilst doubting somewhat the wisdom of this selection, and fearful of falling far short of the expectation that may be based on my ability to fill worthily the chair of President of this Association, I can only say to you now that I have accepted the flattering distinction of presiding over the deliberations of a body of pharmacists, scientists, professors and teachers in the various branches of our profession, most of whom would be far more able and better qualified than myself, on the principle and precept so briefly and eloquently expressed in the words I think of Henry Clay, when offered the nomination for the Presidency of this great country, " that such an office should not be sought nor declined."

Appreciating the fact that as the years roll on, and as our Association grows larger and stronger in membership, and also, I trust, greater in its reputation and in beneficent influence it exerts on our profession throughout this great continent, that it also throws greater responsibilities on its President and officers, I must confess that I enter upon my duties and responsibilities with some misgivings as to the outcome.

It has been my privilege, during my 35 years of membership in this Association, to listen to the words of wisdom, and attend the deliberations of this body under the presiding of such distinguished pharmacists and able parliamentarians as Wm. Proctor, Jr., Edward Parrish, Albert E. Ebert, Wm. S. Thompson, Joseph Roberts, Jno. U. Lloyd, Jos. P. Remington, E. L. Patch, Alfred B. Taylor, James M. Good, and many others of my predecessors, not to forget my distinguished and highly-esteemed immediate predecessor and dear friend, Mr. Henry M. Whitney, and to worthily fit in with such distinguished names, and to do justice to the requirements expected of their successor, is the object of my ambition.

Let me hope that with the assistance of my fellow officers, and especially the counsel and advice of my friends, Mr. Sam'l A. D. Sheppard, our trusted and able Treasurer, and Mr. Chas. Caspari, Jr., our highly-appreciated and efficient General Secretary, I may not prove too great a disappointment, when the time arrives that your verdict shall fall on my efforts to emulate their example, and that, " Well done, thou good and faithful servant," be the reward of my earnest efforts to further the high aims of our great Association, and may greet my ears when I shall transfer this badge of honor to my successor in 1899.

I do not wish to inflict upon you, Mr. President and fellow members, a long address, especially in this very warm and humid atmosphere, and will conclude by thanking you once again, one and all, for this distinguished honor you have conferred upon me.

The new President's remarks were received with favor and applause.

The same committee then escorted the Vice-President-elect to the platform, and Mr. Thompson said :

Mr. President, I take pleasure in presenting to you Dr. Geo. F. Payne, First Vice-President-elect of this Association.

THE PRESIDENT : Dr. Payne, it gives me great pleasure to note your promotion, and to state to you that the "Administration," having taken into consideration your active work in the matter of the Army and Navy, has decided to " advance you several points." (Laughter.) Had you been successful in securing shoulder-straps, you might possibly have been named a Commodore; but now, sir, you are simply a Vice-President. I trust that your grip may be so strong and your voice so serviceable that your services to your superior may be such that a possible higher promotion may come.

Ladies and gentlemen, I have the pleasure of introducing to you Dr. Geo. F. Payne, of Atlanta, Ga. (Applause.)

DR. PAYNE : Mr. President and fellow-members of our American Pharmaceutical Association, ladies and gentlemen: I thank you most heartily for this selection as your First Vice-President. I appreciate the honor most deeply, but I do not feel that I can acknowledge it in as fitting terms as did our worthy President the honor conferred upon him. I looked upon him as he delivered his splendid acknowledgment, and regretted that we could not receive from him an address giving his ideas and wishes for the coming year. We will only be able to have his annual address when his term of office closes, and we can only hope that his successor will carry out what I know will be his most admirable suggestions.

As for myself, as First Vice-President, I occupy a position almost of honor only. There is scarcely anything I can do for the Association in that capacity—except to be First Vice-President, and do nothing. (Laughter.) But if there is anything I can do, I shall certainly be glad to have it suggested to me.

I do not claim to be a leader, but I will do the best I can for you all. And in this connection I want to say that I think the pharmacists of this country ought to take an active hand in helping themselves in legislative matters, and one of the most effective ways to do that is to be a member of a legislative body. I would like to see them run for these offices—run for Councilman, run for the Legislature, run for Congress! Be represented in these bodies, and you will be influential—you will be in a position to command attention and respect in all matters touching pharmaceutical legislation. (Applause.)

THE PRESIDENT: I am exceedingly sorry that a very beautiful speech that you were kind enough to give me the occasion to prepare and present to you must necessarily be lost, on account of the absence of the Second and Third Vice Presidents—the ornamental members of the official force. It, therefore, becomes my duty to present the other officers-elect, but they have made you tired so often (laughter), that I will spare you this time. I refer to Mr. Samuel A. D. Sheppard, Treasurer, Mr. Charles Caspari, Jr., General Secretary, and Mr. C. Lewis Diehl, Reporter on the Progress of Pharmacy. (Applause). The new members of your Council are Messrs. W. S. Thompson, of Washington; Charles A. Rapelye, of Hartford, Conn.; and H. M. Whitney, of Lawrence, Mass. Elected to fill vacancies in Council, John Ingalls, of Macon, Ga., and Thos. F. Main, of New York city.

Fellow-members, I want to thank you, one and all, very heartily, for the distinguished honor you conferred upon me a year ago. I want to thank you for all the kind and courteous treatment received at your hands.

And now, Mr. Dohme, in passing over to you, sir, this emblem of power, I know that, with your genial manner, kindly face and commanding presence, you will not require more than I have the use of it; and wishing you, sir, abundant prosperity and success, and that when you retire it will be with a heart full of love for all this Association, such as I have, I welcome you to the chair. (Great applause.)

President Dohme took the chair.

THE SECRETARY: Mr. President, there is no special business before the meeting now, and the rules require the reading of the minutes of the last session; but this is practically impossible, and if some one will move to dispense with them, I think it would be well.

MR. REMINGTON: Before that is done, Mr. President, I move we hear from a distinguished representative from across the border—a man who has shown great interest in the American Pharmaceutical Association, and represents that good old country that stood by us so nobly in our recent difficulties. I refer to Mr. Thomas D. Reed, of Montreal. (Applause.)

MR. REED: I could not bear to leave you without expressing my thanks to the Association for the great kindness I have experienced during my attendance at this meeting, and I want to thank the Local Committee, too—Mr. Hynson especially. That Committee has been untiring, and he is the Committee; that Committee has been successful, and he is the Committee. We have rejoiced to receive all the fine things he has provided for us in this warm city. Every time I have been to Baltimore, I have found this sort of weather. I suppose the clerk of the weather has to stick up his figures to the very highest to be able to keep up with the warmth and hospitality of the city of Baltimore to the strangers that enter her gates. Gentlemen, the ladies of Baltimore are famed in song and story, and we have met some of them; I am happy to say that for grace, and charm, and hospitality, they live up to their reputation. (Applause,)

I thank you, also, for placing in a position of honor that flag yonder that I think a good deal of. I like to see "Old Glory" and the "Union Jack" there together in peaceful rivalry for the benefit of mankind. They represent two splendid horses, and when they pull together they are irresistible. But it did not need the Hispano-American war to create a kindly feeling between the pharmacists of the United States and those of Canada. You have always had a friendly feeling for us. You gave us a great deal of pleasure when you visited Montreal a few years ago. It was "16 to 1." (Laughter.) We have been living on that pleasure ever since.

I wish to say for myself and on behalf of the other members from across the line that we thank you most heartily. The entertainments of the Baltimore people have been lavish and splendid and attractive—and as you could not control the weather, we will not blame you for that.

It has been a pleasure to me to meet old friends here and make new ones. I think the meeting has been a very successful one, indeed. I am pleased to see Mr. Dohme as President—a gentlemen of the most genial character, of the highest position and standing, and honor as a citizen; and the Association has honored itself in placing such a man at its head. (Great applause.)

Mr. Alpers moved that the reading of the minutes of this session be dispensed with, and the motion was seconded and carried.

MR. REMINGTON: I move that this session of the American Pharmaceutical Association do now adjourn.

The motion was duly seconded and carried.

ELEVENTH SESSION—MONDAY MORNING, SEPTEMBER 12, 1898.

The Association was called to order at 10 o'clock a. m. by President Dohme, in accordance with the resolution adopted at the tenth session.

No new business having been presented and the social session having been concluded, it was on motion of Henry P. Hynson, seconded by H. A. Elliott, agreed that the Association do now adjourn to meet again at Put-In-Bay, O., on Monday, Sept. 4, 1899, at 3 o'clock p. m.

CHAS. CASPARI, JR., *General Secretary*.

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION—TUESDAY, AUGUST 30, 1898.

The Commercial Session was called to order by the Chairman, Mr. Joseph Jacobs, at 8 o'clock p. m.

Mr. Jacobs requested Mr. Whitney to take the chair while he read his address, which was as follows:

Ladies and Gentlemen: The very limited time which the Council has seen proper to allow to our Section (only one night session), and the hour that has been fixed for its meeting being one suggesting the virtues of "tired nature's sweet restorer," will prevent the chair from detaining you with the reading of papers, and must, of necessity, cut short our discussions.

In order to observe the proprieties, it will be necessary to merely enumerate the papers prepared by your Chairman and those obtained from others, and file the papers with our Secretary. The hope is indulged that these papers may find their way to your perusal, and that they may prove of suggestive value and interest.

The papers alluded to are as follows: Co-operative Manufacturing by Retail Pharmacists, by John A. Clark, Hamilton, Ontario. Woman in Pharmacy, by M. C. Dow, Cincinnati, Ohio. Old Drug Stores Made New, by C. H. Bangs, Boston, Mass. Decrease of Drug Stores in the United States, by Joseph Feil, Cleveland, Ohio. Pure Methyl Alcohol and its Uses in Pharmacy, by C. P. Nash, Detroit, Mich. Statistics of the Drug Market, 1897–1898, by W. O. Allison, New York. The Cotton Seed Oil Industry of Georgia, by Joseph Jacobs, Atlanta, Ga. Some of the Drug Conditions during the War between the States, 1861–1865, by Joseph Jacobs, Atlanta, Ga. Changes in the Drug Trade in the past Forty Years—Summary, by Joseph Jacobs, Atlanta, Ga. Some Practical Suggestions from Experience (exhibiting a number of products of home manufacture), by Joseph Jacobs, Atlanta, Ga. Report of the State Department at Washington, D. C., on the Retail Drug Business of the World, made at request of Joseph Jacobs, Atlanta, Ga. The Retail Drug Business before the Advent of the Cutter, by L. E. Sayre, Lawrence, Kans. Gospel of Good Goods, by J. W. T. Knox, Detroit, Mich. Criticism of the War Revenue Law, 1898, by J. W. T. Knox, Detroit, Mich.

In reading the proceedings of all our past meetings, it was noticed that there had been an omission of reports on the drug trade in recent years, and believing that in time the preservation of such facts and figures will prove more and more valuable as statistics easily to be referred to in our Proceedings, and as forming a basis of historical value, Mr. W. O. Allison has complied in giving the leading features of the drug market for the past year. It is recommended that the custom of printing these be revived, or at least, the reports be obtained and filed with the General Secretary.

Early in the year the Chairman sent out to about six hundred members in active business, or retired, the following circular letter:

ATLANTA, GA , *January* 4, '98.

Dear Sir : It has occurred to me that it might be interesting and profitable to us to look back over our experiences of the past one, two or three decades in the drug trade, and see what changes in methods have occurred, and by comparison of ideas we may discover some abandoned practices that were good and profitable, and which might again be used by ourselves and others in the retail business. To the end of preparing a paper to be read at the Baltimore meeting, based on such data, I beg that you will aid me by writing out your experiences in this connection, and sending to me at your earliest convenience.

With view to suggesting such matters as it might seem could be profitably considered in the preparation of such a paper, I append the following:

1. What changes in the method of conducting the drug business have occurred since you began business?

2. In each change noted, state the time made in your locality, the reason same was made, and your criticism of the old and new method.

3. Give criticism of the comparative cost and trouble or expense of the old and new method, and statement of the relative profit or loss in the same.

4. Give as minute description as possible of the differences in the character of merchandise sold by druggists, say, ten, twenty or thirty years ago, and during the intervening periods.

5. In stating the reasons for the changes in your locality, state any local conditions that may have been at the time the cause of same.

6. State anything further in this connection that you may deem of interest.

It was hoped that a majority of those addressed might reply. As a fact, only a small percentage did so. The intention was, by having a mass of such information, to be able to mark the stages of evolution in our business, and from detailed facts, properly classified, deduce causes, and find suggestions that would prove valuable.

The appointment of a committee from this Section is suggested, to stand at least for five years, charged with the duty of noting changes in the drug business, endeavoring to trace their causes, and to study these and offer reports at our meetings on such causes and their beneficent or evil effects.

To supplement the paper, "Changes in the Drug Business," and as a matter connected with the history of our trade, the paper entitled, "Some of the Drug Conditions during the War between the States," is presented. The paper is not intended as exhaustive of the subject, but more in the nature of a contribution showing how blockades and non-intercourse affected the drug conditions of a part of our country in time of war.

The time between the imposition of the new war tax and our meeting has been so short that no valuable information of a general character could be collected. War measures of all kinds are necessarily harsh in their effects and modes. Fiscal legislation enacted in the excitement of the hours preceding or following a war declaration must be fraught with features that might have been omitted on calmer consideration, and in their operation and enforcement there are bound to be inequalities and unexpected difficulties. It is recommended that a joint committee from our Section and that on Legislation and Education be appointed, charged with the duty of collecting facts as to the operation of this law affecting the drug trade, and, by and with the advice and consent of the President and Council, to have the power and the duty to appear before the proper committees of Congress and urge such modifications as may be desirable at the next session of Congress.

Some of the manufacturers have taken a most untenable position in regard to this tax law. About fifteen years ago, when the old revenue tax was removed from medicine, this same class of business men, although an average tax of four per cent. was removed, maintained prices unchanged, on the pleas of higher raw materials and extra cost of new machinery, when the fact was that the price of materials ruled very low, and new machinery was not invested in. These same arguments, with no better foundation in fact, are now employed to justify the advances in prices even beyond the added cost of stamps. Some manufacturers, on the other hand, have patriotically met the situation, keeping the same prices and assuming the war-tax burdens. There seems to be no remedy for this state of affairs. We can, however, make it a point to patronize the more liberal and patriotic class whenever possible, by preference, and thus give aid and comfort to those who are meeting the issues in a manly and liberal spirit.

In calling attention to the paper entitled "Some Practical Suggestions from Experience," the Chair has prepared, and has here the exhibits that are noted in its pages, but the meeting must judge whether or not it will be appropriate for them to be inspected and explained. Occasion, however, is taken to say that the Chair advocates reviving the abandoned custom of having exhibits at our annual meetings; but these exhibits, it is suggested, should be confined to articles and compounds made by members in their own laboratories, thus eliminating any advertising feature, but calling forth a generous, brotherly rivalry between pharmacists in the interchange of ideas on home manufacture.

As a matter belonging more properly to the Section on Education and Legislation, but which touches acutely on our commercial nerves, it is recommended that our Section request the other to look into and see if it would be possible to effect the passage of a law by Congress, requiring foreign proprietary medicines to be manufactured in this country, if patents are granted on them here.

Early in the year, a letter was addressed by your chairman to the "leading pharmacists" of each capital of the South and Central American Republics and of Mexico, enclosed in a letter to the resident consuls of the United States, and enclosing a copy of our Constitution, asking how the pharmacists of those countries might consider coöperation with our Association. The letters of the consuls, saying they had delivered the enclosures to a "leading pharmacist" are present for filing. Not a single pharmacist honored the chairman with a reply. So it seems that our "empire" is not likely to "take its way" southward to any general extent this year.

The following is a copy of a letter addressed to the Hon. John Sherman, then Secretary of State:

OCTOBRR 21, 1897.

HON. JOHN SHERMAN, *Secretary of State:*

Dear Sir: As chairman of the Committee on Commercial Interests of the American Pharmaceutical Association, I desire at our next annual meeting at Baltimore, August, 1898, to present to the Association a review of the Drug Trade of our country, and to furnish as full an account of the drug trade at large as I can obtain from all reliable sources. May I not request the Department of State to aid our Association in the manner as follows: Would it be contrary to the practice of the Department to have prepared a circular letter, directing the consular officers to report to the Department the result of special investigations? If permitted, I would be pleased to submit a paper suggesting the particular points to be covered, that might seem to promise the most beneficial results.

I have the honor to be, most respectfully, JOSEPH JACOBS, *Chairman.*

In consequence of this letter, and at the chairman's request, the following interrogatories were sent to the consuls in all the civilized countries of the world:

TO THE CONSULAR OFFICERS OF THE UNITED STATES.

Gentlemen: The American Pharmaceutical Association of the United States has requested this Department to aid the Association in obtaining certain information in regard to the Drug Trade in foreign countries, and has submitted the following interrogatories to be propounded to the consular officers of the United States in the various countries of their residence:

(1) Is the drug business conducted independently or regulated as to extent and num-

ber of stores by the government? If restricted by law, attach a copy (translated) of the substance of the regulating law.

(2) State what are the differences between the prescription drug business and other drug establishments, if such exist. What are their relative numbers?

(3) Give detailed list of drugs, chemicals, proprietary articles, perfumes and druggists' sundries exported to other countries, especially to the United States, stating value, as far as practicable, in dollars and cents.

(4) Give list of drugs, chemicals, proprietary articles, perfumes and druggists' sundries imported from the United States. State whether any American medical preparations are imitated in your country of residence, and if so, what goods, and to what extent. Are there any laws prohibiting such imitations?

(5) State what, if any drugs, chemicals, proprietary articles, perfumes, druggists' sundries, etc., are sold in the department stores or other stores not drug stores, and to what extent, and whether in such stores the printed or usual retail prices are required or undersold at retail.

(6) What is the law and practice in regard to the final disposition of physicians' prescriptions when once filled by the druggists? Are they kept on file, and for how long?

(7) What is the law governing the renewal of prescriptions. Are druggists permitted to give copies, and under what conditions and circumstances?

(8) What is the law regulating the practice of pharmacy? Are persons holding diplomas from American Colleges of Pharmacy recognized as pharmacists, and allowed to practice their profession?

In replying to this circular you are not to regard yourself as limited in your answers to the questions herein propounded, but give any additional information which in your opinion will be pertinent and valuable.

In consequence of these efforts, the department has published the report on the drug trade in foreign countries which is here presented.* Attention is called to the fact that many documents were received, which might prove interesting, but which are merely filed at Washington as being too bulky to incorporate in the report. It is recommended that the proper vote of thanks be sent to Hon. John Sherman and to Messrs. Frederick Emory and John W. Cridler, assistants, and to the consular officers, collectively, for their effective co-operation.

In the formation of the Committee on Commercial Interests it is recommended that the chairman be allowed to select his own committeemen, or if this may not be constitutionally done, that the nominations should be of men who reside near the chairman, so that the whole committee might conveniently meet in person whenever deemed advisable.

In view of the recent war events and their results and other political changes, it is suggested that the appropriate steps be taken to inform the druggists of Porto Rico and Hawaii that they are eligible to membership in our Association, and that they be asked to co-operate with us.

The Chair awaits the pleasure of the house.

Mr. Mayo moved that the address be referred to a committee to be appointed by the chair.

Mr. Nattans seconded the motion, and it prevailed.

MR. WATSON: As we are only to have one session of this Section, it will hardly be necessary to have a committee at all. We can discuss the report ourselves.

THE TEMPORARY CHAIRMAN: We might appoint a committee, and perhaps in a few moments they will report in favor of another session. Leave it in the hands of the committee, and in the meantime the discussion can go on under the direction of the Chairman of this Section. I will appoint Mr. Redsecker, Mr. Mittelbach and Mr. Mayo as the committee.

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* About 200 copies of this interesting report (a volume of 341 pages) were distributed at the Baltimore meeting, having been kindly furnished by the State Department at Washington, D. C.—THE GENERAL SECRETARY.

MR. REDSECKER: I would like to be excused, but I think we should extend a vote of thanks to the Chairman for the very able report he has presented and for the extraordinary amount of work he has given this subject.

MR. HYNSON: I second that motion. The report shows great power and weight and an unusual amount of work.

THE TEMPORARY CHAIRMAN: I want to say I am rejoiced to see so large a number at this session. I think we have all been well paid for coming here. We have listened to an exceedingly interesting and important paper from the Chairman of the Section.

The motion of Mr. Redsecker, to extend a vote of thanks to the Chairman, was carried by an unanimous rising vote.

Mr. Jacobs at this point resumed the Chair.

MR. STEWART: Mr. Chairman, I would like the rule enforced, if possible, that members when they address the Chair shall state their names and where they are from, so that we may know who is speaking.

THE CHAIRMAN: That is a good suggestion, and I hope the members will bear it in mind.

MR. SHEPPARD: I would like to call for the reading of the report of the Committee on President's Address. A portion of it has reference to the Commercial Section.

THE CHAIRMAN: Was it referred to this Section?

MR. SHEPPARD: Yes, sir; Mr. Whelpley has it, I think.

MR. WHELPLEY: The General Secretary has it, and he is not present.

MR. BURGHEIM: I have been requested to present to this Association a set of resolutions bearing on the stamp tax question and addressed to the drug trade of the United States by the San Antonio Retail Druggists' Association. It is a paper of interest to all retail druggists, and I hope it will receive favorable consideration.

Mr. Bobbitt, Secretary of the Section, read the paper as follows:

To the Druggists and Drug Trade of the United States:

At a meeting of the San Antonio Druggists' Association of San Antonio, Texas, held August 15, 1898, it was unanimously resolved:

1st. That the Internal Revenue Law requiring the stamping of all proprietary medicinal preparations, perfumery and toilet articles, is an unjust law, in that it discriminates againt the retail druggists.

2d. That said law is class legislation, inasmuch as it singles out the wares of one business in particular, and exempts the wares of other classes of business.

3d. That the burden of said tax falls almost entirely on the retail druggist, and not upon the public as is contemplated in all methods of taxation.

4th. That many of the manufacturers have advanced the prices of their preparations to the retail druggists not only to the extent of the additional cost of the stamps, but in some cases 20 per cent. above the prices charged before the law went into effect, without having advanced the retail selling price to the consumer.

5th. That the retail druggist contributes, in addition to said tax, more than any other industry, in proportion to the volume of his business, to the revenue of the government in the heavy tax upon alcohol, which enters into nearly 50 per cent. of the liquid medicines in his stock, and also in the tax exacted from him for the privilege of selling said alcohol.

Wherefore, they call upon the retail druggists and the drug trade of the United States to memorialize Congress to repeal this unjust law, and enact one in its place which will place a tax upon every class of merchandise, of whatever description it may be; and to make said tax effective and easily collectible, that it provide for a tax, in form of a revenue stamp, on all invoices, thereby taxing all industries.

The vast commerce of the nation would require so small a tax on each individual contributing as to be felt by none, while being borne by all industries alike.

That all local and State organizations be requested to use every honorable means of gaining the co-operation of their representatives in Congress and the Senate of the United States to advocate the repeal of said law, and the substitution of any law that will give the druggists the necessary relief.

That a copy of these resolutions be sent for publication to all journals published in the interest of the drug trade, and to local papers; and that a copy be sent to the representative of the Texas State Pharmaceutical Association to the annual convention of the American Pharmaceutical Association to be held at Baltimore, Md., on August 29, 1898, with the request that he read said resolutions before that honorable body.

GEO. J. F. SCHMITT, *President.*

RICHARD COHN, *Secretary.*

THE CHAIRMAN: Gentlemen, you have heard the reading of the paper. If it comes within our province, I would like to know what you will have done with it.

DR. ECCLES: I would like to know if it is not possible to have all resolutions and papers upon a common topic brought together and discussed together, rather than to discuss each one separately, or not discuss them at all.

THE CHAIRMAN: The Chair considers that a good suggestion, but it will be necessary to have a motion.

MR. HYNSON: Would it not be well to appoint a Committee on the several topics and let them report? I move to appoint a Committee on Stamp-Tax.

The motion having been duly seconded by Mr. Mayo, was put and carried.

The Chair appointed Mr. Burgheim, Mr. Main and Mr. Alpers on said Committee, but Mr. Alpers begged to be excused, saying he would be too busy to serve. The Chairman thereupon appointed Mr. Mayo in his place.

DR. ECCLES: I move that the resolution from the Texas Association, and all similar papers * be referred to this Committee.

The motion was seconded and agreed to.

The Chairman called Mr. Sayre to the chair and read a paper prepared by himself, entitled, "Practical Suggestions from Experience."

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* Resolutions and circular letters bearing on the same subject were presented to the Section from the Columbus, Ohio, Drug Association, Iowa Pharmaceutical Association, St. Louis Apothecaries' Association, the Raleigh Druggists' Association, Indiana Pharmaceutical Association, and the druggists of Frankfort, Ky.

PRACTICAL SUGGESTIONS FROM EXPERIENCE.

BY JOSEPH JACOBS.

In a letter received from Mr. H. M. Whitney, President of our Association, the request was made that I prepare a paper on the practical side of our profession, and this is presented in compliance:

As a business problem, pure and simple, the advisability of our druggists making a complete line of distinctive preparations is almost universally admitted, but I do not accept as the sole reason the purpose of replacing patent medicines; for in the present state of trade conditions, we can not afford to oppose their sale. Indeed, I contend that when the law has conferred special patent rights and a manufacturer has spent time, labor, thought and money in fabricating and advertising a preparation, placing it successfully on the market, and a customer applies at your counter calling for this preparation, he is more the customer of the advertiser than yours, and you should not attempt to foist anything else upon him. The instance here stated differs widely from the situation presented by a customer who comes for advice, and demands your personal and professional aid in helping him out of a state of doubt and uncertainty. In the one case it is the paid advertisement of the proprietary owner that brought in your visitor; in the other, it was your own personal character and reputation. In the first stated case, you should supply him with his stated want; in the other, it is your clear right, and often your duty, to recommend some preparation of your own. Thus, by fair dealing you increase your reputation for straightforward action, and your advice is stripped of the suspicion of selfishness.

My experience is that the buyer of patent medicines is generally strongly bent upon procuring them, comes in at your door with a well-settled mind, and that a strong argument is usually necessary to change the current of his thought toward your own preparation. "Even though vanquished," he will buy, but "argue still," in his own thoughts, and will be restless until he has gone to some other store and worked out his original theory.

But the *desideratum* is, how best can a profitable trade in articles of your own make be effected? This, of course, opens a wide field of discussion, but I note only one item. The many economies of judicious advertising may be conserved. For instance, there are cases where drug men have been argued into spending money advertising "Nerve Debility Remedies" in their locality, paying perhaps as much direct to the maker and to the local printer as $8 per dozen for a preparation they could put up at about $10 per gross, and then allowing an article of unknown composition to go into their community under the prestige of their names. Instances have even been known where abortants thus duped our druggists. It is strange that these same men do not take the overplus saved by making some really legitimate and meritorious compound, and spend the advertising money spreading abroad the knowledge of the virtues of their own remedies. It is not necessary nor advisable in many cases to make large contracts for advertising with the newspapers. From experience I have learned than an appearance in your local paper daily with a small ad. of from three to four inches, changing the matter every day, and keeping your own preparations before the public, is best. You will find that it will not be long before that public has become familiar with your preparations, and customers will not only call for them, but when your advice is asked you have an easy task to induce them to buy. Advertising like this has a cumulative effect, and like some medicines, the more concentrated and oftener they are repeated, the more cumulative.

The next point I wish to stress is individuality of preparations. Do not simulate in name or appearance any well known or largely advertised article. Exercise your brains and ingenuity in preparing for the market something unique and original. It is far better to have one original preparation than dozens more or less imitating the patents on the market.

It is the height of business inconsistency to allow some manufacturing pharmacist or non-secret house to prepare for you a line of preparations bearing your name, their composition and method of manufacture being as little known to the druggist as the average patent medicine. This practice works a fraud on your community, besides losing you money. It is a fraud on your customers, because you place your name on a remedy and its claims as an inducement to buy, when you do not and cannot know that the formula has been fully and correctly followed. It is carrying the agency principle too far for fair and upright business practice. When the coin comes from your own mint, you can know that is of the standard weight and fineness.

Let me quote one of the stereotyped arguments used by the manufacturers of non-secret remedies, with their offices full of name blank labels. "Recognizing the fact that many pharmacists cannot, owing to lack of time, help, printing facilities, etc., manufacture all the specialties they sell, we have, at a large expense, equipped a plant for the manufacture of these goods. Although we are opposed to *cheap goods* always, we cannot impose upon the intelligence of the pharmacist by giving him the formula of our non secret remedies (the cost of the ingredients of which he well knows) and at the same time expect his business, unless we can furnish prices which would make it unprofitable for him to make the same goods himself." Such literature and appeals have misled many druggists throughout the land into having their preparations made instead of manufacturing them under their own eye, and the number and extent of these non-secret manufacturing concerns seems to be growing every year. I was about to speak of making goods in the pharmacist's own laboratory, but remembering how few of our drug stores have a department that can be dignified by that name, I must not use the term in any general way.

Let me show the fallacy of these stereotyped arguments: No mammoth “plant” is necessary for success in home manufacture. Equipment on a reasonable scale, and help in comparatively small numbers of employees, are sufficient for a reasonably large number and quantity of specialties. The “time” can be had by rising a little earlier, and moving a little quicker, both conducive to longevity and athletic improvement; the “help” will come for reasonable pay and kind treatment, and “printing facilities” are about as abundant as “proprietary plants,” and no “corner” on their products; and a like answer is possible for all the “so forths.” A salesman for one of these houses, in describing how many labels, cartons, and bottles, varying in places of manufacture, prices and styles, is necessary to be on hand before attempting to manufacture, will talk you into a maze of kaleidoscopic bugbears, that will fade and disappear in the light of a little common-sense reflection.

After all, we have the example of many stores to-day having preparations of more or less extensive sale, put up by the druggist either in his own specially-designed bottle or in some well-known staple style, such as Philadelphia oval or Union oval. Either a plain stock carton is used, employing the same label on carton and bottle, or the label is merely placed on the bottle and the package wrapped in colored paper, making a neat article—“Exhibit A.”

Let me institute a comparison in the savings of some of these articles. Below are prices quoted by one of the large, and by comparison one of the cheapest non-secret manufacturers, of the best known articles on his list:

Compound Extract Sarsaparilla, or any other name if desired, put up in long-neck bottles, neatly wrapped	$3 00 doz.
Emulsion Cod Liver Oil with Hypophosphites Lime and Soda, put up in long-neck panels	4 00 doz.
Female Remedy, put up in 12 oz. panel bottles	4 00 doz.
Kidney and Bladder Cure, put up in 12 oz. panel bottles	4 00 doz,
Soothing Syrup, put up in long, round bottles, holding 2 oz.	1 00 doz.
Cough Balsam, put up in 2 oz. panels	2 00 doz.
Whooping Cough Remedy, put up in 4 oz. panels	1 50 doz.
Children’s Worm Syrup, put up in 2 oz. panels	1 25 doz.
Eye Water, put up in 1 oz. round bottles	75 doz.
Corn Cure, put up in 1½ dr. vial and brush	90 doz.
Corn Salve, put up in ¼ oz. wooden box	75 doz.
Pile Ointment, put up in 1 oz. boxes	1 00 doz.
Healing Salve, put up in 2 oz. boxes	1 20 doz.
Hair Dye, double preparation, put up in two 1 oz. French square bottles	3 00 doz.

“Exhibit B.”

I present herewith a line of preparations made in my place, giving the formulæ and cost of production. I feel confident that the style and appearance will compare favorably with those put up by the non-secret houses, and the difference in the cost of production is set before you. "Exhibit C."

I now submit a line of preparations put up in our store, and labeled "Robinnaire's," made in Paris. These goods are made to supply the demands of customers who compose a class that wish a French label on the bottle. But I wish it to be distinctly understood here and everywhere that they are sold by me and my force under especial orders to be shown when the price of the real French goods is complained at, and with the positive representation that they are home-made, and can be bought by the customer if he wishes to take them on their merits, and he buys if he has a French fad. But I stand here to condemn the practice *in toto*, and think it should be generally discontinued, that of placing foreign labels on our American goods. We must all, merchants in every line of trade, stop this appearance of fraud. At the hazard of wounding the political nerves of some of our members, I will say that I believe it is the result mainly of our tariff system of trade and federal taxation. Besides, it is an unpatriotic, mean, covert admission that Americans can be outdone by any nationality at anything, which I do not feel disposed to admit; for I believe that with our wonderful resources, our intelligence, science and skill, we can, if we try, write *Excelsior* upon anything the product of any effort we may design or make in every line of human endeavor.

The manufacture of handkerchief extracts and articles of a like character can easily be done by the average druggist with very few appliances, and at a great saving. Samples of these goods, with cost of production, are here submitted. "Exhibit D."

Catering to that constantly increasing class of customers known as homeopathics proves to be one of the most profitable parts of the business to-day. A few homeopathic preparations are submitted, with the cost of production. "Exhibit E."

Many other specialties, such as caustic pencils and vaccine shields, can be manufactured at a great saving. I submit samples and cost of both. During the last year, owing to the epidemic of small-pox in our immediate section and its consequently caused public action and general scare, large quantities of shields were disposed of. "Exhibit F."

Putting up bird seed, bird food, and like preparations, is easily done at a large saving. For a long time I was short-sighted enough to pay freight on bird sand and bird gravel, freighting all the way from the East at a cost of double their first price, as much as the whole cost of manufacture at home. These materials I discovered in the branch, while my boys were catching "horny-heads" or running after sweet shrubs and butterflies. "Exhibit G."

In endeavoring to carry out the suggestions of Mr. Whitney, I have endeavored to submit some practical ideas, emphasizing the fact that money can be saved and made by manufacturing a line of original preparations, and that it does not require extensive apparatus nor large investment of capital in raw material. In such preparations as plasters, lozenges and pills, we can avail ourselves of the aid of the manufacturer. "Exhibit H."

Let us commence more and more to develop and cultivate our practical skill in the pursuit of our calling. Surely the trained and educated pharmacists of America can *do* as well as *know* the feats that are naturally expected from their art and science. We live in a wide-awake, progressive age. Let us keep abreast of all the other callings and professions in every worthy line of achievement.

The author of the paper exhibited during its reading a large number of handsomely labeled bottles and packages of preparations put up by himself, as illustrative of his contention that such work could be successfully done by local druggists.

There was great interest manifested in the reading of the paper, and the exhibits were closely inspected, and the writer was heartily applauded when he had concluded the reading.

Mr. Sheppard, seconded by Mr. Helfman, moved that the paper be received, and a special vote of thanks extended to the writer, and the motion prevailed unanimously.

MR. REDSECKER: The Committee on Address of the Chairman of the Section is ready to report.

There being no objection, Mr. Redsecker read the report, as follows:

REPORT OF THE COMMITTEE TO CONSIDER THE ADDRESS OF THE CHAIRMAN OF THE COMMERCIAL SECTION.

Your Committee appointed to consider the address of the Chairman, Mr. Joseph Jacobs, respectfully calls the attention of the Commercial Section to that portion of the address which recommends "that a joint committee from our Section and that on Legislation and Education be appointed, charged with the duty of collecting facts as to the operation of this law (the war-tax law) affecting the drug trade, and by and with the advice and consent of the President and Council, to have the power and the duty to appear before the proper committees of Congress and urge such modifications as may be desirable at the next session of Congress."

We commend the suggestion of the Chairman as to exhibits at the annual meetings of the Association. He says: "Occasion, however, is taken to say that the Chair advocates reviving the abandoned custom of having exhibits at our annual meetings; but these exhibits, it is suggested, should be confined to articles and compounds made by members in their own laboratories, thus eliminating any advertising feature, but calling forth a generous, brotherly rivalry between pharmacists in the interchange of ideas of home manufacture."

We further recommend the adoption of the suggestion that the Section on Legislation and Education be requested to "look into and see if it would be possible to effect the passage of a law by Congress, requiring foreign proprietary medicines to be manufactured in this country, if patents are granted on them here."

We recommend, as requested by the Chairman, that he be permitted to name his own committeemen, "and, if this cannot be constitutionally done, that the nominations should be made of men who reside near the Chairman, so that the whole committee might meet in person whenever deemed advisable."

We recommend the adoption of resolutions of thanks to the Hon. John Sherman, Secretary of State, and Messrs. Frederick Emory and John W. Cridler, Assistants, and to the Cousular officers collectively for their effective co-operation in the collection of valuable data.

Finally, we recommend that a vote of thanks be extended to Mr. Joseph Jacobs, Chairman, for the efficient labor performed as the presiding officer of this section.

Respectfully submitted.

J. H. REDSECKER,
WM. MITTELBACH,
CASWELL A. MAYO,
Committee.

Mr. Bartley, seconded by Mr. Whelpley, moved to receive the report, and to take action on the several sections *seriatim*. The motion prevailed.

MR. REDSECKER: The first item to which the Committee wishes to call the attention of the Section is the imposition of the war tax. I will read that recommendation:

"That a joint committee from our Section and that on Legislation and Education be appointed, charged with the duty of collecting facts as to the operation of this law (the war tax law) affecting the drug trade, and by and with the advice and consent of the President and Council, to have the power and the duty to appear before the proper committees of Congress and urge such modifications as may be desirable at the next session of Congress."

DR. WHELPLEY: Do we not have in the Association a Standing Committee on National Legislation? If so, would not this matter properly come within the province of that committee? And if we want to strengthen that committee, should we not suggest the incorporation of the Special Committee on Legislation?

MR. WHITNEY: It depends on this Section whether they wish to act independently, or with the Committee on National Legislation. It is for the Section to decide.

MR. FREERICKS: We now have a committee working on this same matter, that is the stamp tax, and it would seem that if we now take action on this part of the Chairman's address, we will do so without hearing the report of the other committee on the stamp-tax question.

Dr. Whelpley moved to defer action until the report of the Stamp-tax Committee was received, and the motion was duly seconded and carried.

Mr. Redsecker read the second recommendation:

"Occasion, however, is taken to say that the chair advocates reviving the abandoned custom of having exhibits at our annual meetings; but these exhibits, it is suggested, should be confined to articles and compounds made by members in their own laboratories, thus eliminating any advertising feature, but calling forth a generous, brotherly rivalry between pharmacists in the interchange of ideas of home manufacture."

DR. STEWART: Does not that limit the products to retail pharmacists?

MR. JACOBS: My idea was so to limit it.

DR. STEWART: Would it be proper to move that that suggestion be adopted? If so, I move that it be adopted.

THE TEMPORARY CHAIRMAN: The proposition is that products such as we have had exhibited here to-night shall be exhibited here annually, so that it shall be an interchange of ideas and help the retail pharmacist.

DR. ECCLES: Would that include pharmacists who may be also wholesalers?

MR. JACOBS: I should think so, if manufactured for retail purposes—for dispensing over the counter.

THE TEMPORARY CHAIRMAN: It will be understood that the promoter of this matter in the introduction of these things and the recommendation made by the committee and explained upon the inquiry of Dr. Eccles and Dr. Stewart, and responded to by several others, carries the sense of this Association, unless objection is made here to-night.

DR. WHELPLEY: I know from experience that we often "resolve" and "understand," but soon forget, and I move that the incoming officers of this Section be requested to make a special effort to obtain exhibits of pharmaceuticals manufactured by retail pharmacists for our next meeting. I think that is the sense of the Chairman's address, and if we do that the subject is not likely to be so soon forgotten.

MR. HELFMAN: I second the remarks of Dr. Whelpley, because it will leave this Section free to encourage exhibits of retail druggists without saying to other members of the Association, "We do not want you." It gives rise to no invidious distinctions.

The motion of Dr. Stewart, as modified by Dr. Whelpley, was carried.

Mr. Redsecker read the third recommendation.

DR. ECCLES: I move that this matter be referred to the Section on Education and Legislation as recommended by the Chairman, with the recommendation.

The motion was seconded and carried.

MR. REDSECKER: The next recommendation is that a vote of thanks be tendered to the Hon. John Sherman and the Assistant Secretaries and the Consular officers, respectively, for their co-operation in this matter.

The motion was duly seconded and carried.

MR. REDSECKER: In the formation of the Committee on Commercial Interests, it was recommended that the chairman be allowed to select his own committeemen; or, if that cannot constitutionally be done, that the nominations be of men who reside near the chairman.

Upon motion, this matter was referred to the Council.

DR. LYONS: When the Chairman's address was read, I thought I noticed a disposition not to regard seriously the recommendations of the Chairman to invite the druggists of Porto Rico and the Hawaiian Islands to co-operate with this Association and take part in its deliberations. When the soldiers went from San Francisco to the Hawaiian Islands the people of Honolulu took measures to entertain our boys, and the man appointed chairman of a committee of one hundred there was the leading druggist of Honolulu, and they were exceedingly kind to our people; and I am in favor of the recommendation of the Chairman touching that matter. I know something about these people, and I think they deserve this recognition.

DR. ECCLES: If appropriate at this point, I would like to move a vote of thanks for the work done with the United States Government by the Chairman. The thought itself of getting the Government to help in a work of this kind, was really a grand conception, to say nothing of the other ideas elaborated in the report; and I think we ought to render a special vote of thanks at this time to the Chairman for his action in this regard.

The motion was unanimously carried.

Dr. Stewart: I make a motion that the suggestion of the Chairman be adopted in regard to asking the pharmacists of Honolulu and Porto Rico to become members and take part in the deliberations of this body.

The motion prevailed.

Chairman Jacobs resumed the chair.

Dr. Whelpley: A large portion of our President's address was along the line of emphasizing the commercial side of pharmacy in the American Pharmaceutical Association, and one suggestion was that the Commercial Section be urged to do something for the retail druggists. Evidently our Chairman anticipated that, and much has been done—in fact, I feel free to say, more than has ever been accomplished before in all time, by the single effort made with the Consuls of the United States.

But certain recommendations were added. One was this: That the National Formulary be increased in its usefulness by the addition of popular household remedies, such as cough cures, liniments, etc. And another: That the United States Pharmacopœia and National Formulary be bound in one volume in 1900—the latter to appear as an appendix to the larger and older work. These are the two recommendations referred to this Section by the General Association. The first, that this Section consider the advisability of introducing into the revised edition of the National Formulary, or as an appendix to the present Formulary, popular household remedies, I think should now be considered and acted upon.

The Chairman: It has been suggested that formulas of household remedies be added to the National Formulary. This is open for discussion.

Mr. Ryan: I move that this be referred to the Committee on National Formulary.

Dr. Stewart: Does that carry any recommendation?

Mr. Whitney: I would like to say a word on that subject. We are all aware that this stamp-tax is in the mind of almost everybody; that all the elixirs of the National Formulary are not exempt. The first point in my mind was that the National Formulary as at present presented to us be added to the next edition of the United States Pharmacopœia, so as to become standard. It was also suggested that this Association should adopt formulæ for such domestic remedies as it saw fit, in its judgment, to present to the public in each locality, one kind that could be relied on and be satisfactory; that forty thousand pharmacists in this country would boom it and make it a success far surpassing any patent article on the market. And what is better than for this Association to back the retail pharmacists of this country? If the Scientific Section will come into this commercial side and give us the benefit of its experience and knowledge, we can accomplish a great deal of good, not only for ourselves but for the benefit of humanity.

Mr. Alpers: While at first sight this first recommendation seems to be a good one, and certainly is in such localities where druggists depend entirely on their own resources, or where there are no physicians, or where the physicians are antagonistic to them, I would advise that this be referred to the Committee on National Formulary, and have it discussed before we pass on it, because it might react against us. We should use all efforts, I think, to induce our physicians to prescribe the preparations of the National Formulary. We have, at our own expense, printed epitomes to induce physicians to use it. If these physicians find household remedies in there, I think we will find we are handling a boomerang, for that would be against the interest of the physician.

Mr. McKenzie (delegate from Canada): The gentleman who has just taken his seat has referred to that particular feature which it appears will be brought up against the introduction of the formulas as suggested by the President. With the retail druggists of Canada—I don't know whether it applies to the retail druggists of the United States—the greatest trouble they have at the present time is with the physician that makes up his own medicine. The question of proprietary remedies and their introduction to the trade of this great empire was brought to the attention of the Association in such a practical form by you, Mr. President, that I feel we should have at every meeting of the Pharmaceutical Association every druggist who desires to see advancement in his business. There is a commercial side and a scientific side to our business. The existence of the druggist of the past has been a precarious one in some sense, and it is growing more so from appearances. The question is, are we going to cast out that portion of our business that comes from the proprietary remedies and maintain ourselves on the scientific portion alone? If the President's suggestion is carried out, you have a line of preparations which probably receive the stamp of authority from the United States Pharmacopœia, but it is incorporated in the National Formulary in such a way that the druggists will say these are well-considered formulas; and perhaps it will meet with the approval of the druggists of the United States and Canada.

Dr. Eccles: This is a two-edged sword. It must be handled with skill, or it will cut the man who wields it instead of the man it is aimed at. In the National Formulary to-day there are formulæ that are not scientific. There can be no fault to be found with any number of such formulæ as long as they have no scientific worth, and are not absolute quackery. There can be no limit to this if you do not put them in as household remedies, for every Tom, Dick and Harry to use for himself. If you begin to let down the bars in this direction, there is no logical stopping-place. You will have to put into the National Formulary "love powders" to give a man love; you will have to have "luck powders" to give a man luck, and there will be no end to that sort of stuff. No physician will find fault with the Formulary as at present conducted, but the moment you begin to make it a family medicine book, that moment you are getting on dangerous ground. You are assuming the responsibility of prescribing yourself for patients. You are throwing down the division line that it has taken a century to raise up—you are going back a hundred years instead of advancing. Just as the druggist prescribes more and more over the counter, so the physician will dispense his drugs at home more and more. It is inevitable. When you go a little further in your practices, the doctors will meet you half way. I suggest that these remedies be not put in the Formulary as household remedies. I believe it is a dangerous experiment.

In the statement by Dr. Whelpley, he spoke of the interest that has been shown in this Section here. Now, gentlemen, the reason why there has been no interest in this Section in the past, is because there has been nothing to interest us. But the moment an interesting question arises, then the American Pharmaceutical Association shows itself determined to interest itself in the good of the pharmacists. We want to lessen the trials and tribulations of our pharmacists, instead of increasing them, and concentrate all our forces in one direction.

Mr. Hynson: We have a Committee on National Formulary, and we are bound to refer this matter to that committee. I think this question should go to that committee. It should not be discussed by this Section before that committee reports.

Mr. Mittelbach: I have probably worked on National Formulary preparations more than the average druggist. Just previous to the inception of the Formulary by this Association, I had a copy of the New York and Brooklyn Formulary, which I believe the National Formulary is based on. The smallness of that book is no doubt what induced the New York and Brooklyn pharmacists to manufacture its preparations. I think our National Formulary has gotten too large. There are a number of formulas in there now for a single preparation in many cases, for instance, the formula for emulsions. The committee that has this formula in charge has left it to the druggists to take choice of five or six bases for emulsion; that is too many. There should be one formula—the best that can be devised.

As regards attaching the National Formulary to the United States Pharmacopœia, I do not think that practicable, because there are different parties that prepare them, and only such things, I think, should go into the Pharmacopœia as are tried and proved.

I have had a good deal of experience in preparing simple preparations for physicians, and in this way I have probably introduced from thirty to forty of these preparations. My physicians who have confidence in me will not hesitate when I prepare an elixir of quinine, iron and strychnine to say, "That is just what I want."

Mr. Sheppard: I think we are wandering from the subject. The retail druggists of this country to-day are suffering, and in the West they are threatening to start a strictly Retail Druggists' Association. Why? They say the American Pharmaceutical Association refuses to help the retail druggists. We are here to-night to try to answer that question. Are we going to try to help them directly? This movement suggested is a radical one—a radical change from the former policy of the American Pharmaceutical Association. Let us look that square in the face. But what are the facts? What is the condition of the retail drug trade compared with twenty-five years ago? The retail dealers to-day have in their stores a large stock of proprietary articles, running from 40 to 75 per cent. of their total sales, and experience has shown that the only way for them to make money is for them to put up their own goods. Mr. Jacobs has emphasized that fact. It has become apparent that there is a necessity—an absolute necessity—for the retail druggist to do something to help himself, and here is the proposition. It does not agree with the former ethics of this Association that anything of a proprietary character should be exhibited here; but there is this difference, and I think under the present conditions and new arrangements and commerce it is justifiable.

The suggestion is made that this Association furnish good, reliable formulas for household remedies. These are not secret. These are preparations to be published, and every physician, druggist and citizen can see for himself whether good or harmful. The druggist can put up these preparations under his own label, and can recommend them as semi-official, and I think the experiment worth trying.

It seems to me that this Association—and Section—wants to do something definite and practical for the retail druggists. Leave off all these fancy ideas; I use that term for want of a better one. Let us look at this question and others, so far as we can, honestly and squarely, with a clear conscience, and not try to dodge them. The retailers are suffering, and are looking to us for help; and if we cannot help them, they will try to help themselves. I think this is the great opportunity of this Association. It is held by many, in the West particularly, that there should be an organization composed of retailers entirely, and that they can do better than we can. We have manufacturers, we have college professors and a number of allied branches in our membership; but we have in this Association the brains of the drug trade of the country as well; and I think these allied branches will help the business of the retailers, and will do their work rightly and properly. I say, let us keep the work in this Association. I do not think there is any necessary antagonism between the retailers and the other classes; I think we can co-operate, and now is the time to do it.

Mr. Eliel: I desire to emphasize the statement made by Mr. Sheppard regarding the feeling in the West. But, Mr. Chairman, I desire to differ with him in his remarks, as to confining this work entirely to this Association. I think it is entirely within the province of the Commercial Section of the American Pharmaceutical Association to co-operate with the desire of the Western druggists. I have in my hand a lot of documents that have been sent me in connection with the desire of the Western druggists, and if there should be time this evening, I should like an opportunity to bring the matter up here.

Dr. Stewart: I desire as chairman of the Committee on National Legislation, to have the report on National Legislation also referred to the Committee on Formulary.

Mr. Selzer: I think the American Pharmaceutical Association has taken the right step to interest the retail druggists of the United States, and I certainly think that when this report comes out they will say that the American Pharmaceutical Association is the body to look to, and that it will not be wise to form another association, to be composed of retail druggists only.

Mr. Ryan: The motion was that the recommendation made by the Chairman be referred to the National Formulary Committee without recommendation.

The motion was put and carried.

Mr. Whelpley: The second recommendation was that the National Formulary be printed as an appendix and bound with the revised edition of the United States Pharmacopœia of 1900, and that steps be taken by this Section looking to that end.

Dr. Eccles: This suggestion is in unison with the efforts of the Pharmacopœia Committee all along, that the book be a book for pharmacists. The medical profession recognizes that. It will also bring it in unison with the methods pursued in France, but in a better shape. It will make the volume sell better. It will make many who would not otherwise have the Pharmacopœia buy that book. I move that this recommendation be accepted and that we recommend that the two volumes be bound together.

Mr. Thompson: I move that the matter be referred to the Committee on the Revision of the United States Pharmacopœia.

Dr. Eccles: I accept that as an amendment to my motion.

Mr Remington: Is it the intention of the American Pharmaceutical Association to recommend to the next committee on Pharmacopœia that the National Formulary be published with the Pharmacopœia?

The Chairman: I think that is beyond the scope of the Commercial Section.

Mr. Remington: I think it is beyond the scope of the American Pharmaceutical Association. The Committee on the Revision of the Pharmacopœia of the United States is a body consisting of doctors, druggists and representatives of colleges of medicine and universities all over the country, and I know very well they will not publish the National Formulary as coming from the Committee on the Revision of the United States Pharmacopœia.

Mr. Thompson: My motion was to refer to the United States Pharmacopœia Committee of this Association.

Mr. Remington: The National Formulary is a child of the American Pharmaceutical Association, and the American Pharmaceutical Association has received more credit for the getting out of that National Formulary than for anything else it has done—than for any one specific thing—and I want to see it kept where it is. You certainly would not want to see the National Formulary incorporated with the United States Pharmacopœia, because if the formulas are good enough to be in the Pharmacopœia they should be put in it. The National Formulary has done a great and good work in the way of unofficial preparations, and I hope the American Pharmaceutical Association will keep it as it is now.

DR. ECCLES: I know of no move that would be more certain to popularize the Pharmacopœia than the introduction of the National Formulary as the work of the American Pharmaceutical Association, simply bound in the same cover, so that they would carry each other into the same drug store. And if it is beyond the scope of the Committee on Revision to act on this, there is a way in which it can be acted on, and that is for our Committee on Pharmacopœia to present it to the Convention for consideration, with all the weighty arguments it can present. I believe that the time will come when these two volumes must go out together, because it is the decree of fate, as I see it, and there is no getting away from it.

MR. DOHME: I am decidedly of the opinion of Prof. Remington on this subject. The formulas in our Formulary are mostly ephemeral. They are not such as should be bound in the United States Pharmacopœia. They are now bound with the Dispensatories, and in them they may find their proper place. I do not think we should request the National Committee on Revision of the United States Pharmacopœia to admit this book. I do not think it is proper, and we should wait until we are asked. I think the book is where it should be, connected with the Dispensatories. (Applause.)

MR. REMINGTON: The National Formulary is revised by this body much more frequently than the Pharmacopœia, and I take it that the Committee on Revision of the United States Pharmacopœia have the right to—and I know the American Pharmaceutical Association would be too glad if they would—accept any formulas out of the National Formulary for the Pharmacopœia that they found deserving. If the American Pharmaceutical Association presents a report which I think should go to the next convention for revising the Pharmacopœia, recommending that the successful preparations go into the Pharmacopœia, that would be well. We are changing the formulas all the time—we are developing them; and then is the time they should go into the Pharmacopœia, after they are proven. But I do not think we should publish the National Formulary in connection with the Pharmacopœia.

MR. SAYRE: We have two years, at least, to discuss this matter in, and we have a number of valuable papers to consider, and time is fleeting.

The motion of Mr. Thompson to refer this question to the Committee on Revision of the Pharmacopœia was carried.

THE CHAIRMAN: I do not know of anything else before the house just now, and Mr. Mayo has a report to make.

MR. ELIEL: I have something before the house, Mr. Chairman. I have a letter here from a gentleman in Chicago, representing the Chicago Retail Druggists' Association, and I desire at this time to read some extracts from this letter showing how the Western people feel in regard to commercial matters—especially regarding the Commercial Section of the American Pharmaceutical Association; and in connection with that I desire to offer a resolution. I will read from the letter first. This letter is signed by Mr. Wooten, President of the Chicago Retail Druggists' Association.

Mr. Eliel then read the following abstract from Mr. Wooten's letter:

"The feeling is growing (I am sure this cannot be gainsaid) that as the arbiter of the retail druggists' commercial interests, the American Pharmaceutical Association has signally failed. That this is true, is not the fault of those who have controlled its destinies. It is needless to discuss here the cause; it is sufficient that a truth made more evident each succeeding year should be acknowledged. What can be done by a national association of retail druggists, represented in yearly convention by its best and most successful business men, meeting at the same time and the same place as the jobbers and the manufacturers, is, of course, a matter of uncertainty; but it is a plan the Chicago Retail Druggists' Association believes can be made brilliantly successful. It is believed that the good effects of such an organization will become apparent at once. In furtherance of our efforts, we need and deserve to have the moral support of the Commercial Section of the American Pharmaceutical Association."

Mr. Eliel also offered the following resolutions:

Resolved, That the Commercial Section of the American Pharmaceutical Association heartily endorses the effort being made to form a permanent national organization of retail druggists, having for its exclusive object the commercial welfare of its members.

Resolved, That the plan of holding a delegate convention of retailers in St. Louis on October 17, 1898, the same time and place as are held the annual meetings of the National Wholesale Druggists' Association and of the Proprietors' Association of America, is commended to the favorable consideration of all State, county, and local associations of retail druggists.

MR. REDSECKER: I will second the resolutions, but did not hear them, and may vote against them. (Laughter.)

DR. BARTLEY: I will second the first, but not the second resolution.

MR. DEWOODY: I joined this Association in 1887. At that time we had what was known as the Retail Druggists' Association. It was found to be inefficient, and was, by common consent, merged into this. I have been in almost constant attendance at the American Pharmaceutical Association, and especially the Commercial Section. I feel that relief will come through the National Association. I do not think it has been a failure. We cannot change commercial conditions by resolutions. But this Association has done all that could be done by an association of pharmacists. Those that have been blaming this Association are themselves to blame for not having taken a more active part in its deliberations.

MR. STEWART: I move to lay the resolutions on the table.

MR. ELIEL: It makes no difference what action we take with reference to the matter; there is going to be a national druggists' association formed in St. Louis, and those who are about to organize this association ask that the Commercial Section of the American Pharmaceutical Association be represented in that convention. Whether it be wise or unwise to organize another retail association, let the lines be what they may, that association will be formed; and I think if we have any desire to have any voice in whatever that association may do, it will be wise on our part to appoint delegates and be represented there.

Mr. Stewart's motion to lay on the table was seconded and carried.

MR. MAYO: As a member of the committee to consider the stamp-tax, I will say that Mr. Main was appointed a member also, but the committee had to act without him. I will read the report:

REPORT OF COMMITTEE ON STAMP-TAX.

To the Chairman and Members of the Section on Commercial Interests:

Your Committee report that a communication has been received from the San Antonio Druggists' Association in which they call upon the retail druggists and the drug trade of the United States to memorialize Congress to repeal the stamp-tax law as it now stands, and in its place to enact a law imposing a stamp-tax upon every class of merchandise through the medium of a stamp-tax on all invoices.

Since we doubt if this would be feasible, your Committee propose that this Section put itself on record as protesting against the unjust discrimination against the drug trade, which is made by confining the stamp-tax to medicines and perfumery, and that the Section memorialize Congress requesting that the stamp-tax be applied also to all articles of a proprietary nature put up in packages for popular sale, whether the article be in the nature of a food, a beverage, a cosmetic, a medicine, or for use in the arts.

Communications have also been received from the Raleigh Druggists' Association and druggists of Frankfort, Ky., protesting against the advances in price on proprietary goods beyond the amount of expense entailed by the imposition of the stamp-tax. They condemn the action of the manufacturers, and announce that they have by their action forfeited the good-will of the retail drug trade. They also state that they will use their influence in behalf of the goods of those manufacturers who have not advanced their prices.

In view of the well-known facts which have led up to the passage of these and similar resolutions by associations of the retail drug trade all over the United States, your Committee recommend the passage of the following resolutions:

Resolved, That the members of this Association and the retail drug trade of the United States generally, be urged to show their appreciation of the good-will shown by those manufacturers who have not advanced their prices at all, or have not advanced them beyond the amount required to cover the increased cost entailed by the imposition of the stamp-tax, in a substantial manner by urging the sale of their goods; and

Resolved, That the Commercial Section of the American Pharmaceutical Association condemn the policy of those manufacturers who have utilized the imposition of the war tax as an excuse for a very material advance in the price of their goods, beyond the amount required to cover the cost of the said war tax.

J. BURGHEIM,
CASWELL A. MAYO,
Committee.

Upon motion of Mr. Freericks, duly seconded, the report of the Committee was adopted.

MR. FREERICKS: I move that when we adjourn, it be to meet Friday evening next. I do not believe that we should meet at the same time with the Scientific Section, and be in conflict with it.

MR. MAYO: I move that when this Section adjourns, it adjourn to meet to-morrow morning at 9:30 o'clock.

The question was put upon Mr. Mayo's motion, and it prevailed.

MR. WATSON: I think the Commercial Section should always have two sessions. The meetings have heretofore been of very little interest, mainly because we did not have the proper material in the chair, and other places, to enlist the interest of members; but I think we will have that hereafter, and I think we should have two sessions, and that request should be made of the Council for one of these sessions to be in the day-time.

MR. REMINGTON: Inasmuch as the Section will have another session, I desire to say something in regard to the Commercial Section of the American Pharmaceutical Association. At the Cincinnati meeting, a number of years ago, the question of dividing the work of the Association into Sections, as you all know, came up, and we decided upon making various Sections of the Association in order that all the interests of pharmacy should have attention. I have seen in pharmaceutical journals articles condemning the Commercial Section of this Association. I have never taken any stock in such publications. I believe the Association broad enough and big enough to consider all the departments of the profession of pharmacy, and when I hear a man say, "We don't want to know anything about prices," I put him down as a man who does not understand the scope and object of the American Pharmaceutical Association; and, on the other hand, when I hear a man say he has no use for science, I put him down as a narrow-minded fellow. And when a college professor says he does not want to hear anything except about college work, I think he is unfit for full membership in the American Pharmaceutical Association. I am delighted to come here and see this Section so fully attended, and so much interest manifested, and so many scientific men here—who, however, have not said much; but I am glad to see them. This Association is wide enough and big enough to take in all departments of pharmacy. And I hope that the interest that has been shown here will continue.

MR. REDSECKER: I was glad to hear the remarks of Prof. Remington that this is a broad organization, and I think the resolutions of Mr. Eliel should be taken from the table. If the Association is so broad as has been described, let us do that.

THE CHAIRMAN: The motion before the house is, that the Council in the future be requested to give two sessions to the Commercial Section—at least two sessions—and I will put that motion.

The motion was carried.

DR. STEWART: As I moved to lay the resolutions on the table at the beginning, and as I do not think the matter was properly understood at all, I move now to take them off the table, and that they be considered.

The motion was carried.

The resolutions were read again by Mr. Bobbitt, the Secretary of the Section.

MR. ELIEL: These resolutions are made in conformity with the call made by the Chicago Retail Druggists' Association, which I think represents a body of about nine hundred registered pharmacists in Cook County, Illinois. At a very largely attended meeting of this Association, held at the Tremont House, on the 11th of August, the following call was issued:

CHICAGO RETAIL DRUGGISTS' ASSOCIATION RESOLUTIONS.

At a meeting held in the Tremont House, Chicago, August 11, 1898, the Executive Board of the Chicago Retail Druggists' Association passed the following resolutions:

WHEREAS, The recent advance of prices by many manufacturers of proprietary and patent preparations, is but one more instance of the advantage taken of the retail drug trade by reason of its present inability to act through a united and centralized influence for the protection of its commercial interests; and,

Whereas, The action taken by many State and local retail druggists' organizations in every section of the country is unanimously favorable to united action in protesting against this latest imposition on the retailer; and,

Whereas, The members of the Chicago Retail Druggists' Association are united in urging that some step be taken to secure relief from this and other wrongs suffered by the retail druggists, the Executive Board of the said Association, called in special session to consider means of relief, after a thorough canvass of the condition of the retail drug trade at the present time, adopts the following resolutions;

Resolved, That in accordance with the expressed sentiment of the retail druggists of Chicago, the Chicago Retail Druggists' Association appoint a special Committee of fifteen to prepare and issue an invitation to the State and local retail druggists' associations of the United States, requesting their co-operation in holding a delegate convention in St. Louis, October 17, 1898, at the same time as the annual meeting of the National Wholesale Druggists' Association and of the Proprietary Association of America, to the end that the protests of the retail drug trade against the action of the manufacturers in shifting the burden of the stamp tax upon the shoulders of the retailer may be made effective; and, further,

Resolved, That being firmly convinced the present is a particularly auspicious time for the establishment of a permanent national organization of retail druggists which shall promote the commercial interests of its members, we recommend to the said Committee the inauguration of a movement and the formulation of plans for the creation of such a national body at the proposed meeting in St. Louis.

T. V. WOOTEN, *President*.
J. S. HOTTINGER, *Secretary*.

MR. REDSECKER: I move that this matter be referred to a special committee, which shall be appointed, and that that committee report at the next meeting of the Commercial Section, and I am not to be a member of that committee. (Laughter.)

The motion was seconded and carried.

The chairman appointed Mr. Remington, Mr. Eliel and Mr. Stewart on said committee.

On motion, Mr. Redsecker and Mr. Caspari were added to the committee.

THE CHAIRMAN: I want to call your attention to the fact that we must attend to one item of business, viz.: the nomination of officers, before this Section adjourns.

MR. MAYO: I move that the Chairman appoint a committee of five as a nominating committee.

The motion was seconded and carried.

The chairman appointed on said committee Messrs. John F. Patton, W. L. Dewoody, William McIntyre, Mason B. Wood and S. P. Watson.

On motion, the Section adjourned to meet to-morrow morning at 9 o'clock.

ADJOURNED SESSION—WEDNESDAY MORNING, AUGUST 31, 1898.

Chairman Jacobs called the adjourned session of the Commercial Section to order at 9:30 a. m.

The report of the committee on the resolutions presented by Mr. Eliel, the day before, was called for, but the chairman of the committee was not present, and the reading of the report was deferred.

The Chair announced that the next thing in order was the reading of papers, and Mr. Feil read a paper by himself on "The Decrease of Drug Stores in the United States."

DECREASE OF DRUG STORES IN THE UNITED STATES.

BY JOSEPH FEIL.

According to the opinion of those persons who have made a careful study of the population of the United States, the large cities are all rapidly increasing in inhabitants, the towns and larger villages are stationary in this respect, while the smaller villages and the agricultural districts are very slowly losing in population, but as a whole a steady and comparatively rapid increase of population is taking place, estimated at above one million persons per year.

It is interesting in connection with the above facts to note the decrease of drug stores (and undoubtedly druggists) throughout our country, and notice the sections where this is taking place. Below is given a table of the number of drug stores in each State as approximately found on January first of each of the years mentioned, taken from the valuable publication known as "The Era Druggist's Directory."

States.	1896.	1897.	1898.
Alabama	416	372	383
Alaska	4	4	5
Arizona	52	46	49
Arkansas	606	540	556
California	835	847	857
Colorado	347	343	349
Connecticut	453	443	477
Delaware	107	105	102
District of Columbia	212	205	198
Florida	298	271	262
Georgia	630	563	569
Idaho	82	80	81
Illinois	2872	2819	2687
Indiana	1865	1911	1828
Indian Territory	203	176	174
Iowa	1637	1592	1569
Kansas	1128	1102	1071
Kentucky	997	954	892
Louisiana	397	402	397
Maine	409	417	403
Maryland	559	557	551
Massachusetts	1644	1559	1505
Michigan	1642	1580	1474
Minnesota	805	786	738
Mississippi	424	398	366
Missouri	2296	2219	2074
Montana	103	93	97
Nebraska	835	783	769
Nevada	28	27	26
New Hampshire	219	228	228
New Jersey	813	791	744
New Mexico	50	47	47
New York	3439	3454	3338
North Carolina	341	355	349
North Dakota	183	183	177
Ohio	2165	2159	2195
Oklahoma	127	112	109
Oregon	276	253	236
Pennsylvania	2922	2952	2868
Rhode Island	242	218	204
South Carolina	286	264	268
South Dakota	296	277	273
Tennessee	576	533	539
Texas	1708	1427	1387
Utah	105	93	87
Vermont	196	197	193
Virginia	439	404	422
Washington	282	262	264
West Virginia	256	229	218
Wisconsin	820	794	787
Wyoming	37	37	35
Totals	37,664	36,463	35,467

The above table shows that practically not a single State has any increase in the number of stores it contains worth considering, the few showing an increase consisting of the smaller States, except Ohio; and all States containing cities with largely-increasing populations have steadily lost in the past two years, again excepting Ohio, from two to twenty-five per cent. of their stores.

Below is given another table, showing the various losses in States having estimated populations above 2,000,000. The populations given below are estimated by expert geographical authorities for January 1, 1898:

STATE.	Population.	Per cent. Decrease.
New York	7,000,000	2.9
Pennsylvania	6,000,000	1.8
Illinois	4,500,000	6.4
Ohio	4,000,000	(1.3 increase)
Missouri	3,200,000	9.8
Texas	3,000,000	24.6
Indiana	2,715,000	2.
Massachusetts	2,600,000	8.5
Michigan	2,250,000	10.2
Georgia	2,200,000	10.6
Wisconsin	2,150,000	4.
Iowa	2,150,000	4.2
Kentucky	2,000,000	10.5
Tennessee	2,000,000	6.4

It will be seen from the above that the losses are not sectional, that they are very irregular in quantity, and that the same one or several causes must tend to produce such general results.

The loss through the entire country is as follows:

	Number.	Per. cent.
Less in 1897 than 1896	1201	3.2
Less in 1898 than 1897	996	2.7
Less in 1898 than 1896	2197	5.9

If this rate of decrease continued, it would be impossible to get enough retail druggists for an American Pharmaceutical Association meeting in about thirty-five years.

The wholesale druggists numbered in 1896, 296; in 1897, 290; in 1898, 284; showing a regular and steady decrease, and at this rate the National Wholesale Druggists' Association would die for want of membership in about forty-seven years. These pessimistic views are not admissible, and from many standpoints, which I do not care to go into in detail at present, I believe that when the retailers number about 25,000 and the wholesalers about 200, equilibrium will be established and the decrease cease.

Cleveland, O., August 11, 1898.

Mr. Sayre moved that the paper take the usual course, and be referred to the Committee on Publications.

The motion was seconded by Mr. Alpers, and carried.

MR. ALPERS: I would like to express my thanks to Mr. Feil for having made this compilation. It is a revelation to most of us, who have been of the impression that there have been too many stores, and that they were on the increase. From this paper we see that it is right the other way. There is a question that he has not touched on, that is, whether it is a good or bad indication for the drug business. That might be considered a good sign at first blush, but is there not this side to the question? As the population of the country continually increases, we would naturally expect that the number of drug stores should increase, and there is a certain economical side to the question that will perhaps come up hereafter.

MR. FEIL: I may say here that I started this paper on the idea of an increase of drug stores in the United States, and found to my surprise that they had decreased.

MR. ELIEL: The only answer to be made to the conditions, as found by this paper, is that the decrease in the number of drug stores in the United States is owing to the depressed business conditions all over the country during this time. I do not see any other way it could have happened. During the two years preceding the panic of 1893, drug stores were being set up all over the country, and they are simply getting down to the proper basis now. It is the same with the wholesale druggists. A good many in the cities have consolidated—combined—and in that way you can account for the decrease there.

DR. WHELPLEY: The decrease in the number of wholesale drug stores in the United States dates back much further than our recent financial stringency. During the last twenty-five or thirty years, there has been a steady decrease in the number of wholesale drug houses in the United States, and particularly in the larger and older cities. In St. Louis we have less than half as many as we had twenty years ago. Whether it is an evidence of small profits, or whether those who were formerly in the wholesale drug business found more profitable fields in other lines, or whether they have become wealthy and retired from business, is for you to settle among yourselves.

MR. ARNY: Referring to the paper of Prof. Feil, we find, for instance, in the city of Cleveland there should be enough business to support one hundred drug stores, and about fifteen years ago there were that many. Everybody was making a living, and the young men in large numbers went into business, and they soon had a hundred and fifty. But the income was naturally greatly reduced, and the drug stores finally correspondingly decreased. I think the condition is the result of overdoing the business. As to Ohio, there is a fellowship among the druggists that helps the business in that State. There is also less cutting in that State than in any other. They have a better organization there among the pharmacists than elsewhere. I know in Cleveland they have a pharmaceutical association of a hundred and fifty members, and with an attendance of forty members. The percentage attending is something like twenty per cent., instead of the small per cent. named here last night as the rule in such matters. If there is such an increase in Ohio, I think it is due to the organization in the State and the relations existing between the druggists.

DR. LYONS: I can only wish that we shall use and take advantage of the information that has been so carefully gathered. But I regret that the writer did not give us more fully his deductions drawn from his investigations. If the writer had given us the figures as to so many drug stores per thousand of population, that would have been of considerable advantage. It would have involved considerable work, I know.

The druggists of the country have been looking to the Commercial Section of our Association and blaming it because it has not done certain things. The certain things that the Commercial Section of our Association has not done are precisely the things that the druggists throughout the country must do for themselves. If the druggists in each State have an organization of their own and only two per cent. attend the meetings, it is evident that they themselves are not taking any interest in their business. The State of Michigan, I presume, is represented by less than half a dozen members at this meeting, and in this Section by a still smaller number. At the State Association meetings probably less than ten per cent. of the members will be present. It does not stop there. We must have not only State organizations kept up well, but also local organizations. The State must have its druggists that are intelligent—who do not expect to have everything done for them by the American Pharmaceutical Association, but are looking after their own interests at home, and recognize that if anything is to be done they must co-operate at home. It would be of little use to start a half dozen organizations to do the work this organization should or will do if the small organizations at home will do their work.

MR. FEIL: The increase of population of the United States on an average has been about 10 per cent. since 1890. Therefore you must consider that if a State has lost 10 per cent. actual loss, it is perhaps a loss nearer eleven per cent. in proportion to population—that is, the increase in population is about 10 per cent., so that relatively the loss of stores is greater.

THE CHAIRMAN: We will have a paper now from Prof. Sayre.

Prof. Sayre read his paper entitled "The Drug Business before the Advent of the Cutter."

THE DRUG BUSINESS BEFORE THE ADVENT OF THE CUTTER.

BY LUCIUS E. SAYRE, LAWRENCE, KANS.

In the presence of so many pharmacists of wide experience, it may seem presumptuous for me to describe the drug business before the advent of the cutter. The truth is, I feel entirely incapable of undertaking such a task, especially as most of you have probably as wide a knowledge concerning the subject as I have. Doubtless your knowledge, like mine, is based on personal experience in the business both before and after the cutter's arrival. It is therefore with much hesitation that I undertake to fulfil the request of the Chairman of this Section in presenting a paper whose subject is already so familiar to you. I must all the more ask your leniency as I have had no opportunities for looking up any material bearing on this subject; so if my theory serves me false in any case, you will, I am sure, make due allowances.

It was with great anxiety that I watched the ever-increasing encroachments of the cutter, and I can say that personally, I have fought this enemy to the best of my ability. It was largely due to my interest and to the active part that I played in endeavoring to impede the progress of the enemy, that I was made a member of the committee whose combined efforts were devoted in following out a plan of attack. This plan, known as the Campion plan, was the first decisive action taken. I can think of no other reason for the Chairman asking me to present a paper of this title unless it be on account of my past efforts.

It would perhaps be well before going into details, to ask a few questions, the answers to which will make clear the subject at hand. What is the function of pharmacy, and how was this function fulfilled in the past as compared with the present? It is evident that the primary function of the pharmacist is to prepare and dispense medicines, to supply these to the physician or to his patients upon his order, and to supply certain classes of remedial agents to the public such as the physicians are not expected to furnish, and yet which are needful for the comfort and care of the sick. It has also always been considered the special prerogative of the pharmacist to furnish such toilet articles as may be classified under the general head of druggists' sundries. This latter privilege, if it may be so called, of the pharmacist is, of course, modified greatly by public opinion. In former times, without exception, the pharmacist was looked to as the proper source for furnishing all articles of this nature. There was no question at that time as to the proper place to go for purchasing such articles as toilet soaps, tooth brushes, hair brushes, proprietary medicines, or remedial agents of any class.

Then, too, the physician regarded the pharmacist as the proper medium for supplying medicines to patients upon his prescription. The compounding of the prescription was a pharmaceutical service which the physician regarded as worthy of compensation, a service which has always required special knowledge, skill, and extreme carefulness, one that should bring the pharmacist into the close co-operation of the physician. There was always a sort of mutual understanding between the physician and the pharmacist that the one should prescribe and the other dispense. As is usually the case when there is no written agreement, the duties of the one have been, to a degree, usurped by the other. But the special cases where this occurred provoked little comment or feeling. It was before the day when the subject of the relation of the physician and the pharmacist was so vigorously discussed. One of the characteristic features of this early period of the drug trade, and one which ought to be mentioned as a means of showing the trend of pharmacy, was the comparative absence of what is known as "elegant pharmacy." At that time, castor oil was not so disguised "that children cried for it," nor could one purchase lemon or vanilla-flavored postage stamps. Upon entering the store, one's attention was not instantly called to the bottles of elixirs, medicated wines, gelatine-coated pills, tablets, etc., whose glaring and showy labels made their presence quite evident. And yet, withal, pharmacy was a comparatively lucrative profession. It was not the few who occupied favorite sites on the principal streets in the larger cities who made a good living. There are, however, a number of professions that one should not choose if he desires to amass a fortune. Pharmacy, in my opinion, should head this list. The position of the pharmacist has never been an enviable one; it has meant long and tiresome days, with comparatively little return in anything more substantial than honor and gray hairs.

Not least among the differences between the time before the advent of the cutter and the present, may be mentioned the absence of the immense retail stores. This includes, of course, the department stores which have swallowed everything, as well as the immense so-called pharmacies where, in a great measure, the bargain-counter has supplanted the prescription desk. These new institutions have brought to the surface business skill and sagacity, coupled with shrewdness. The money-making side has been unduly emphasized, and the worthy men who have held by an ideal ethical standard, have, in many cases, been driven to the wall. Although the modern methods and business principles are greatly encouraged by the public, I am decidedly skeptical as to the benefit gained by the profession of pharmacy. The druggist has been brought to a peculiarly precarious position, and the one who has held loyally to high ethical standards has been obliged to adopt all possible expedients, in order to continue his profession according to his high ideals.

On motion, Mr. Sayre's paper was referred for publication.

MR. REMINGTON: The committee to whom was referred the proposition to send delegates to the proposed St. Louis convention of retail druggists on October 17th, beg leave to present their report.

REPORT OF COMMITTEE ON PROPOSITION TO SEND DELEGATES TO A PROPOSED CONVENTION OF RETAIL DRUGGISTS.

The committee appointed by the Chairman of the Commercial Section of the American Pharmaceutical Association, to whom was referred the proposition to send delegates to a proposed convention of retail druggists, to be held in the city of St. Louis, October 17, 1898, beg leave to submit the following resolutions:

WHEREAS, The need of a national organization which shall occupy itself exclusively with the commercial needs of the retail drug trade in the United States is apparent; the interests of the retail druggist having been ignored repeatedly by other bodies, including our Government, this always resulting in pecuniary loss; therefore be it

Resolved, That whilst it is not in the power of the American Pharmaceutical Association officially to aid in the organization of the proposed Retail Druggists' Association, whose call for a convention is based on the advance in prices of proprietary and patented preparations, that this Association heartily desires the success of every organized effort of retail druggists which will protect their commercial and pecuniary interests.

Resolved, That a copy of these resolutions be forwarded to the President of the Chicago Retail Druggists' Association and to the Secretary of the National Retail Druggists' Association when organized.

J. P. REMINGTON,
LEO ELIEL,
F. E. STEWART,
J. H. REDSECKER,
Committee.

On motion, duly seconded, it was agreed that the report be received and the resolutions adopted.

By request of the Chairman, Mr. Eliel took the chair.

MR. JACOBS: Partly in answer to Mr. Sayre's paper, as well as to the change in the drug business, I will read an abstract from a paper on the Changes in the Drug Business, written by myself.

CHANGES IN THE DRUG BUSINESS.

BY JOSEPH JACOBS.

On the 4th day of January, 1898, I mailed a copy of the following circular letter to six hundred druggists, mainly members of the Association, but some to druggists in retirement who are not members:

"*Dear Sir:* It has occurred to me that it might be interesting and profitable for us to look back over our experiences of the past one, two or three decades in the drug trade, and see what changes in methods have occurred, and, by comparison of ideas, we may discover some abandoned practices that were good and profitable and which might again be used by ourselves and others in the retail business. To the end of preparing a paper to be read at the Baltimore meeting, based on such data, I beg that you will aid me by writing out your experiences in this connection and sending to me at your earliest convenience.

"With a view to suggesting such matters as it might seem could be profitably considered in the preparation of such a paper, I append the following:

"1. What changes in the method of conducting the drug business have occurred since you began business?

"2. In each change noted, state the time when made in your locality, the reason the same was made, and your criticism of the new method.

"3. Give criticism of the comparative cost and trouble and expense of the old and new methods, and statement of the relative profit or loss in the same.

"4. Give as minute description as possible of the differences in the character of merchandise sold by druggists, say, ten, twenty or thirty years ago, and during the intervening periods.

"5. In stating the reasons for the changes in your locality, state any local conditions that may have been, at the time, the cause of the change.

"6. State anything further in this connection you may deem of interest."

In response to these requests, I received replies from less than ten per cent. of the druggists to whom they were made, and a few unfulfilled promises to reply.

I present a summary of these replies, with occasional extracts from them.

Philadelphia, in the 40's, with one-fourth its present population, had four times as many wholesale drug houses as it has to-day, though one of its present firms does as much in sales as a half dozen did in those days. The great change toward concentration in that locality occurred in the 60's, when every wholesale house, with perhaps one or two exceptions, began to send out traveling salesmen. Previous to this time it was customary for buyers to make semi-annual trips to the great eastern centres and personally inspect the markets. The system of drummers had been in use in other branches of trade, and some of these branches were encroaching on the drug lines; so, very naturally, the druggist followed.

Another change was in the administrative department, which occurred in the latter part of the 60's. Previously the apprentice system prevailed in almost all occupations, and continued in the drug trade long after it was given up in the others. Not that there were any formal indentures, but there was usually a verbal agreement to remain four years, which was almost universally kept. During our civil war, the young men became restless, and so, after two years, boys from the country were relied on—boys who wished one or two years of experience and then to take a course at the college.

Rents, labor and everything were cheaper in the 40's and 50's than afterward: but the troubles of the pharmacist were not then lessened by telegraphic, stenographic and telephone facilities. An estimate of the cost of doing business at this period gives it at three to five *per centum* on what would now be considered a small volume, and the gross profits ranged anywhere from thirty to forty-five *per centum*. There are as many as five articles kept in stock now for one kept then. The larger proportion of these is comprised of proprietary articles. In the forties there were not exceeding one hundred current patent medicines, while to-day they are estimated by some as high as five thousand.

In those days the cross-roads-store wants were amply supplied with the old English remedies, such as Godfrey's Cordial, Bateman Drops, Turlington Balsam, Dewees' Carminative, etc., which seemed to cover all the ills of humanity, and which every druggist made and put up for himself. The literary matter on the wrappers was as bold and empiric as that of to-day. The general sales were of the crude drugs and standard chemicals.

What is true of Philadelphia in these respects is true of the other great centres of distribution.

During 1860–1870 nearly every large drug house established a laboratory, and put on the market a line of specialties of its own.

In the dispensing trade, the old-time soda fountain occupied a very modest corner, instead of often being a main feature as now. The retailer who first introduced cigars in the community was considered a great innovator. In those days the government had not availed itself of the druggist's services in distributing postage stamps, nor had the druggist invaded the provinces of the confectioner, the grocer, the silver-ware man and the fancy-goods dealer. On the other hand, the department store and cutter had not made inroads on the druggist.

Powdered drugs were avoided for fear of adulteration. In nearly every store could be seen the hard-worked apprentice making up Cook's pills, compound cathartic pills, mercurial ointment, and attending to the stone jars in which tinctures were made by maceration.

Among the patent medicines sold in the 50's may be enumerated, pain killer, mustang liniment, Ayer's, Jayne's and Loudon's family remedies, Townsend's sarsaparilla, Wistar's balsam of wild cherry, Winslow's soothing syrup.

S. P. Townsend was the first patent medicine man perhaps who pursued a course of general advertising in this country. These medicines were left on commission, and once or twice a year agents came through the country to take stock, collect for goods sold, and leave new supplies.

Prescriptions were few and far between, most of the physicians having offices in which they carried a stock of medicines and had their students prepare their prescriptions. Now and then there came a demand for some old remedial agent like Theriac, reminding of the time of Hildegard. The doctors of those days frequently prescribed infusions and decoctions, and these generally to be sent out in large bottles, giving the opportunity for a good profit. Calomel was generally prescribed in doses of from 20 to 30 grains, but quinine scarcely ever in larger doses than two grains.

The principal wants of the physicians were calomel, aromatic sulphuric acid, rhubarb, jalap, ipecac, quinine, but not much of the latter, as they all generally used cinchona bark (both red and yellow), gentian, colombo, quassia and aloes, and some antimonal wine. These seemed to be nearly the extent of their materia medica in many localities. Of course there were some educated men and some pharmacists in those days, but most of those engaged in the drug trade were mere merchants. There were very few stores outside of the cities and large towns, and these were always connected with the sale of some other class of goods. One of my correspondents says that he can now look back with amusement in remembering how the physician connected with his father's store would prescribe for some ailment of a visitor, then proceed to measure out a quart of pegs for a shoemaker, and promptly turn to wrap up a pound of mackerel for another buyer. In all this, he says, the profits were very small, and no man could live on his drug trade alone, when whisky sold at 6¼ cents a quart, and tinctures at 3 cents an ounce. It must be remembered that alcohol could then be bought at 50 cents a gallon, while now the revenue tax is over $2.

Before the aniline dyes were discovered, the druggist sold a great many dye stuffs, such as indigo, logwood, fustic, camwood and madder.

About 1865, as well as during the war, the physicians had begun the practice, more generally, of writing prescriptions, and hence there was required a greater variety of drugs and very much larger stocks than formerly, and there was thus required greater knowledge and skill on the part of the druggist. The profits on prescriptions were limited only by conscience. Special stamp tax had more than doubled the price of alcohol and an equal increase in the cost of nearly every other ingredient entering into prescriptions, as well as the increase in the value of labor, caused higher prices to obtain. Drugs and medicines were easily ordered by mail, but the selection of druggists' sundries and toilet articles had to be largely done by personal visits to market. Goods were bought generally in much larger quantities than now, the intention being to provide a year's stock; and New York and Philadelphia were the markets where such purchases were principally made, while now many other points are in competition. The traveling salesman called with his sample cases so frequently that mail orders were less often sent, and the transportation facilities were so full that the amount of stock to be carried was much less than in former years.

The officinal tinctures were then standard medicines, all made from the crude drugs, the process being by maceration; but a little later Tilden & Co. came into the market with fluid extracts.

One effect of these changes has been to lessen the labor of the pharmacist. Thirty minutes were often spent on a batch of pills which are now counted from a stock bottle and dispensed in a few moments.

The sugar-coated pill and the elixir were the beginning of elegant pharmacy. These were crude and imperfect at first, but have each year improved. Concentrated medicines have made doses of certain size, but the retail pharmacist has suffered greatly from the fact that much labor that was required of him, and well paid for, is now done in the large pharmaceutical laboratories.

I have the following from a small Missouri town: "There is very little if any change in conducting the business since I began, 18 years ago, at this place. Sales are somewhat smaller and profits cut down. Then, we occasionally sold a little job lot to country physicians; now we do not, wholesalers look up that trade. Eighteen years ago, I had a fine trade in combs, brushes, etc.; now the department stores get it. Coal oil and lubricating oil were at that time profitable articles for me; now I don't handle them at all. Our drug-stores then supplied the painters with all their supplies; now we furnish a very small part. Our physicians have stopped buying their supplies from us; the tablet makers have captured them 'soul and body.' Even the grocers are handling sulphur, copperas, alum, rosin and other heavy goods of ours." From 1880 to 1890 there was a change in the methods of the physician from being strictly a prescriber to becoming a partial dispenser. The development of more rapid means of communication between the business centres and the suburban districts has had an effect in contracting the volume of trade, and also in reducing the profits which naturally followed, owing to sharper competition by rival houses.

Every one who replied to the circular agreed that our pharmacists have made a mistake in relying too much on the manufacturers. The back room of the old-time store had much to be commended, as it gave to apprentices a practical as well as theoretical knowledge of compounds and manipulations, and was a source of good profit to the proprietor. Many have awakened to this fact, and, instead of dividing profits with the manufacturers, are making their own general preparations and their own proprietary compounds.

The average profits, as far as indicated, were, during the 60's, 40 per cent.; the 70's, 33 per cent.; the 80's, 30 per cent. At the present time, the expenses are agreed to be as great on a much larger volume, while the profits have been outdone from 5 to 10 per cent.

To show the difference in the price of crude drugs, 1866–1898, I append an invoice that was rendered by Burnham & Van Schaack, January 25, 1866, to E. M. Bray, of Joliet, Ill. The amount of the bill was $235.85, which at present market prices would be $157.92, a saving of over 50 per cent. :

	1866.	1898.
Oil of origanum, pure	$1.20 lb.	$0.30
Burgundy pitch	.30 "	.06
Common glue	.18 "	.09
Venice turpentine	.50 "	.22
Bromide of potash	1.00 oz.	.03
Iodide of potash	4.75 "	.15
Arnica flowers (bright)	.40 lb.	.11
Chloride lime	.09 "	.03
Grocers' cream tartar	.28 "	.16
Croton oil	18.00 "	1.30
Iodide sulphur	.75 oz.	.30
Fluid extract stillingia	4.86 lb.	.86
" " valerian	1.60 "	.79
" " buchu	2.40 "	1.13
" " cubeb	2.60 "	1.58
Gum camphor	1.30 "	.38
" opium	9.00 "	2.90
Acetate morphia	8.00 oz.	2.15

Commenting on the changes in our business, and making deductions therefrom, the following are the main ideas expressed : "The changes in the methods of conducting the drug business are principally the decline of the prescription department, the introduction of the tablet triturate, the manufacture of physicians' private recipes by the large manufacturing establishments, the preference of many physicians for the ready-made compounds, and the absorption of the department stores of the line of goods generally known as toilet, fancy, and sundries." I quote a large retailer during this period : "From 1880 to 1890, the physicians gradually changed from prescribers to partial dispensers. Besides this, the public began to fail to appreciate the character and quality of goods, in connection with the price, and hence the pharmacist with a select and reliable line could not compete with the cheaper line offered by his cut-price competitor." "The loss in this class of trade has been partially offset by the endeavor to increase the sale of our own compounds, of our own toilet necessaries, as well as pharmaceutical preparations. In some cases the result has been satisfactory, as a better profit has been realized on a less investment of capital."

In regard to local conditions, the reasons are summed up as follows : Rapid communication between business centres, productive of civilization ; the influence of the department stores, aided by the drug price-cutter and the apathy of the pharmacist in not rising to meet the emergencies.

To overcome these conditions many replies suggest that an effort be made to establish closer and more confidential relations with the physicians, endeavors to secure the confidence of the public by proving goods of your own manufacture to be reliable and meritorious, and by showing that the interest of the community is that of the pharmacists, and that they are prepared to advance that interest morally, professionally, and in all material affairs.

One of my contributors to this paper thinks that a better class of men are engaged to-day in the drug business than ever before. He says that our pharmaceutical colleges are turning out men better qualified than ever, that men in the drug business are more progressive, men of wider range of general information than nearly any other line of business, yet he deplores that their education and learning is only a satisfaction to themselves, is hardly needed in the business, and very poorly rewarded.

Another thinks there are too many drug stores, and cites the case of Chicago with 946 regularly opened establishments. This large number he thinks is partly due to the fierce competition among wholesale establishments to enlarge trade, and suggests that the number could be materially reduced if the board of pharmacy would be more exacting in their requirements.

Another notes that the differences between the time of the advent of the "cutter" and after it, are not so well marked. He says that before the cutters' time we had no immense retail pharmacies selling broken packages at wholesale prices, except to the retailer. Now they are planted in nearly every large city. Before, the retailer could make a living on a stock of $3000, and cash sales of $10 a day. Now, it is impossible to do this, and adhere to the drug business proper. This revolution, he says, has been brought about by the trade activity. Wide awake business pharmacists discovered the way of snatching trade, and took advantage of business opportunities in what the world calls a business-like way, which means with shrewdness. This business sagacity on the part of a few has, he says, invaded the ranks of the *professional pharmacy*. He concludes by saying that, unfortunately for them, there has not been discovered any financial self-protection against this apparently cruel invasion.

As to changes in the drug business, most of the replies noted that those changes corresponded with those that have occurred in nearly every line of trade. Human progress means changing conditions that are of a permanent nature, are usually gradual, and so many circumstances conspire to bring them about that it is almost impossible to fix the exact time or name the controlling final cause. It is like trying to fix the changing seasons, or to note the gradual expansion of plant growth.

The percentage of cost of conducting a business is influenced in an exact ratio to the extent of the expansion or contraction of that business.

Manufacturing enterprises of late have concentrated their forces and their capital, and processes have cheapened. In this change of condition many small producers have failed, but on the other hand the products to the general consumer have been cheapened.

Competition among pharmacists and physicians, like that among all other branches of human endeavor, has resulted in our educational institutions increasing the number of their graduates beyond the most liberal needs of the people, which has resulted in a greater or less degradation of the professions to the commercial standard.

The stock in the average pharmacy of to-day, much of it, is foreign to pharmacy, while the average physician is often merely a distributing agent for some pharmaceutical manufacturer. The commercial side of pharmacy is not likely to advance the scientific side. One devotee can only hope to receive his reward in dollars and cents; the other has to be content with the praise of his benefited fellow-men, with the chance of great riches and fame through some important world-benefiting discovery.

This is the day of the specialist. The first-class business man in the drug line will make money, and his less gifted fellow brother will not. He who originates and makes in his own laboratory a remedy to meet every reasonable want, produces what he sells, and then has the ability and tact to sell such articles, is bound to survive. They who have followed this policy have felt but lightly the pressure of hard times. The commercial side of pharmacy affords as good a field for merchandising as any other business, and he who has the talent for trade can develop it with as sure an expectation of reward in the drug business as the average successful man in any other branch of commerce.

It was moved and seconded that the paper be accepted with the thanks of the Association, and be referred to the Committee on Publication.

The motion prevailed.

Mr. Watson read the report of the Committee on Nominations, as follows:

Your Committee on Nominations recommends for officers of the Commercial Section, for the ensuing year, the following:

Chairman—Joseph Jacobs, Atlanta, Ga.

Secretary—J. Hal. Bobbitt, Raleigh, N. C.

Associate Members—Wm. Mittelbach, Boonville, Md.; J. S. Robinson, Memphis, Tenn.; Clay W. Holmes, Elmira, N. Y.

Respectfully submitted,

S. P. WATSON,
JOHN F. PATTON,
MASON B. WOOD,
W. L. DEWOODY,
WILLIAM MCINTYRE.

MR. WATSON: Mr. Jacobs was violently opposed to accepting the place of Chairman again, but we thought it indispensable that he be re-nominated. We are just at the turning point now, and his services are indispensable.

Dr. Eccles moved that the Chairman of the Nominating Committee deposit the vote of the Commercial Section electing the officers named for the ensuing year. The motion was carried, and that duty was performed.

Mr. Knox read a paper upon "The Gospel of Good Goods," as follows:

THE GOSPEL OF GOOD GOODS.

BY JAMES W. T. KNOX, PH. C.

If we may be permitted to paraphrase a very good and very old proposition, we might ask, "What shall it profit a man to sell goods all day, if he does not make any money on them?" And what shall it profit a man to put in all his time making ten cent sales, when he might as well be selling the same number of twenty-five and fifty cent packages? The retail druggist is in business for what he can get out of it, and when the profit ceases to be sufficient to pay bills and buy bread for his family, it is time to stop and ask "what is the matter? where are we at?" We have all heard the cut-rate problem discussed in its various phases, I do not know how long, for I have heard it ever since I went into the business eleven years ago. Perhaps we shall hear it for eleven years more before we get it settled. What I have to discuss before you gentlemen of the retail drug trade is not a "problem," but merely a plain business proposition, something that does not require so much organized, as individual effort. It is the question of selling cheap goods.

A President of the United States once aptly said: "A cheap coat makes a cheap man." We might say with equal force that "cheap drugs make a cheap druggist" in the opinion of the public. Then the cure for that is to throw out the cheap goods.

By cheap goods I mean the dime and nickel packages which litter the counter of so many drug stores, and which for some unexplained reason many druggists push in preference to higher-priced, better and more profitable goods. To be sure there are a few legitimate ten cent articles, such as potassium chlorate lozenges, soda-mint tablets, cachous, etc. But headache wafers are not a legitimate ten-cent article, neither is pile ointment, laxative tablets, and a dozen other articles that might be named. The custom of years has fixed the prices of these articles at from twenty-five to fifty cents for packages of appropriate sizes. Now is it not sheer folly to offer goods at five and ten cents when one might just as easily and in the same time sell the twenty-five or fifty cent packages? Let us always remember that medicines are necessities, or are considered so by the people who buy them. People do not buy medicines because they taste good or because they are pretty or because it is any fun to buy them—the sole and only reason on earth that they buy our goods is, because they need them, or think they do, which answers the purpose of our case. Bearing this in mind, why should we teach them to buy in such small amounts? What excuse can any druggist offer for pushing a ten-cent package of pile ointment on which he makes about three or four cents, when with exactly the same effort and expenditure of time he could sell the regulation fifty-cent package and make twenty-five cents on it? (For I am now supposing that the druggist who is wide awake enough to leave dime and nickel goods severely alone is a good enough business man to sell his own preparations and make a living profit on them.) What is the reason? One man said to me rather sharply once when I asked this question: "Well, the reason is, they sell." Postage stamps sell, but that is no sign that it pays to handle them. A thing must not only sell, but it must pay a profit, and it must not interfere with the sale of something that pays a better profit. I saw a dime package of pile ointment on the counter, and asked, "Does this sell?" "Yes," was the reply, "just sold a package a few minutes ago." "Do you sell five times as many packages of it as you did of the fifty-cent. article?" I asked. "No, not twice as many, in fact, but few if any more than I sold of the other," he said. "How much of the fifty-cent article do you sell, now that you are pushing the ten-cent size?" I asked. "None to speak of," he said. So there it is. This druggist was deliberately cutting his own throat to accommodate some one else. What was true of the article in question was true of nearly everything else in his line of dime and nickel goods. The druggist who pushes that kind of goods is competing not only with all the other fellows, but with himself as well. What does he gain? Nothing. What does he lose? Well, he loses time, for it takes from three to five times as much time to sell the same amount of ten-cent goods as it does to sell twenty-five and fifty-cent goods, and if a druggist's time is not worth something to him, he is in a bad way. He loses money, because his higher-priced goods, that he has his money invested in, stay on the shelves while people buy the dime and nickel packages. He loses the confidence of the people that trade with him, because they grow to look on his store as a sort of a cheap counter: nine people out of ten associate cheapness in price with cheapness in quality; and right here, confidentially, I want to say they don't always miss it either when they guess that way. He loses trade, because people get to saying, "if you want something *good*, you can always get it at Blank's" and Blank is his competitor's name. He loses in self-respect, for there are not many druggists who do not feel that they are worthy of better things than handling dime and nickel nostrums.

What to do? Throw out the dime goods; that is to say, take them off the counters and show-cases, and put them back where they will not be seen. Then when a man comes in and asks for them, sell him the twenty-five or fifty-cent articles. I used to find it sufficient to say, "Yes, sir, we keep those cheap goods for people who want that kind, but we do not even think of offering them to our good customers. The best of everything is none too good for our trade." That always settled it. Not many people want cheap goods when it comes to medicines. More than that, it is surprising how few calls there are for the dime and nickel goods after they are taken out of display. The fact is that most of them have not merit enough to ever create a steady demand, and if they are out of sight they are surely out of mind. It is not a difficult matter to switch people on to the right track now, because they have not yet become well accustomed to buying in dime quantities. But in a few years it will be different. People will want not only their ointments, pills, cough lozenges and headache cure in dime packages, but they will want ten-cent bottles of cod-liver oil emulsion, laxative syrup, cough syrup, soothing syrup, and liniment. No druggist wants to see the drug business get in that channel, yet there are thousands of them who are driving it in that direction as fast as they can.

Why not quit it? Why not return to the plan of selling people the largest packages you can induce them to buy, instead of the smallest?

Why not educate the people in the opposite direction, instead of teaching them to buy cheap goods? Why not teach them the gospel of *good*, fair priced goods? If you expect to get a good thing you are willing to pay for it; why not teach your customers the same thing? You do not expect to get a good suit of clothes for $5, a good hat for $1, or a good pair of shoes for $2.49, but you know very well that in buying a suit of clothes, if you pay only $5 you are less apt to get five dollars' worth than you are to get twenty-five dollars' worth if you pay twenty-five dollars. Why not educate your customers that good drugs are worth paying for, just as truly as good food and good clothing?

I'd rather be a fifty-cent pharmacist than a "dime druggist" any day: I would hate for people to think that I was running a ten-cent counter. If I were going to run a ten-cent store I would get into the business of selling tin pans, washboards, flower-pots, and cream pitchers. But if I were going into the drug business, I would sell goods that would pay me for the trouble of making the sales, or I would try some other. The same thing applies to all other kinds of goods, drug sundries, fluid extracts, and what not. If you get a good thing you have to pay for it, and you ought to be willing to. Most druggists know that, and in fact more people know it than most of us think; that is the reason why it is possible to show them that it does not pay to fool with cheap drugs, any more than it does to buy shoddy clothing, split-leather shoes, or cheap hats.

Above all, look out for your own interests when you are selling goods, and heed not the siren song of the smooth promoters of dime and nickel goods. Ask yourself this question, "Will they come into competition with other, better, high-priced, and more profitable goods?" If so, you don't want them, for you will not sell enough more to make up the difference.

To be sure, this question of dime goods is only a little thing, but the drug business is made up of little things. It's the little things we have to look out for, or we'll never have any big things to take care of.

Mr. Watson moved that the paper read by Mr. Knox be received and referred to the Committee on Publication.

Mr. Redsecker: There is a great deal of good sense in that paper, and I want to commend Mr. Knox. It takes just as long to sell a ten-cent package as a 25- or 50-cent package, and I regret very much to see that the trade has run into the ten-cent goods—these "ten-centers," as they are called. It is getting to be a sort of "Cheap John" business. I do not encourage it myself. I keep ten-cent goods, of course, but I do not parade them. I give them to customers, of course, if they will have them. The result of this sort of thing has been that your volume of business is decreasing, and the profits decreasing, and the business is growing smaller by degrees; instead of enlarging, the business is diminishing. I want to commend very heartily the excellent paper the gentleman has presented.

Mr. Boring: For eighteen years I have heard that sort of talk. But one factor is being eliminated—that is, the public. If they do not get these goods in a drug store they will get them elsewhere. They generally know what they want, and if they want a 10-cent plaster, you will get left if you try to talk them into a 25-cent one. They generally know their minds when they come into the store. Moreover, it is not the retail druggist who has done this thing; it is the manufacturer, and he must dance to the music at last.

Mr. Redsecker: My experience is very different from that of Mr. Boring. To-morrow I will celebrate the forty-first anniversary of my entering the drug business, and I am a young man yet. (Laughter.) In my section, up in Pennsylvania, the population is largely German. If you get a man's confidence, I find it is not difficult to sell him pretty much what you want. Within the last two years, since the cut-rate got into our town and played havoc with it, notwithstanding that fifty per cent. of the goods we sell are proprietary preparations, our sales have about held up to what they were before. We push our own goods. If a man comes in and asks for Hood's Sarsaparilla, we sell him "Dr. Wood's," at fifty cents, and make a little, when we do not make anything at seventy cents on the other. I pay the clerks a percentage on all the preparations we make, and they are directly interested in their sale. We have no trouble in getting twenty-five cents for a plaster we make, though, of course, where a man wants a ten-cent plaster he can get it. I found that the manufacturers were coming in and selling our physicians tablets and tablet triturates, and I found it necessary to put in a machine to make them; and we now have two, and sell tablets to physicians, and make a little something on them. We get the manufacturers' and jobbers' prices, meet the prices of the manufacturers, and make a reasonable profit on them, and so with our fluid extracts, and we have no difficulty in selling them to the physicians. If you treat your physician trade and your retail trade properly, and they get confidence in you, you have no trouble in selling your own goods. I have found it so, and that is the experience of a good many years.

Mr. Main: In regard to the ability to sell twenty-five- and fifty-cent preparations instead of ten-cent ones, I think it is only necessary to have a little business activity behind the counter. One of our brightest retailers asked me one day if I had seen a line of brushes a European was showing in New York. He said: "What do you think of nail brushes at $120 a gross?" I said, "They are high-priced. Did you buy any?" "No; but I bought some at $60 a gross, and when a man comes in for a nail-brush, he does not know what they cost, and he comes with the idea of paying a quarter. When he sees the quality of the goods I show, he does not like to buy the cheaper goods, and pays $1.50 or $2.00." That is the way he did it.

On motion the following papers were read by title and accepted and referred to the Committee on Publication:

Co-operative Manufacturing by Retail Druggists in Ontario, Canada. By John A. Clark, Hamilton, Can.

Report on the Drug Market for the Year ending July 1, 1898. By W. O. Allison, New York.

Old Drug Stores Made New. By C. H. Bangs, Boston, Mass.

Criticism of the War Revenue Tax of 1898. By J. W. T. Knox, Detroit, Mich.

Women as Pharmacists. By Miss M. C. Dow, Cincinnati, O.

A Volunteer Paper for the Commercial Section. By H. M. Whitney, Boston, Mass.

The Cotton-seed Oil Industry in Georgia. By Joseph Jacobs, Atlanta, Ga.

Pure Methyl Alcohol and Its Uses in Pharmacy. By C. P. Nash, Detroit, Mich.

Some of the Drug Conditions During the War Between the States, 1861–1865. By Joseph Jacobs, Atlanta, Ga.

Mr. Redsecker took the Chair and appointed Mr. Main and Mr. Lemberger to escort the Chairman-elect to the platform.

MR. MAIN: Mr. Chairman, we take pleasure in introducing to you Mr. Joseph Jacobs, Chairman-elect of this Section.

MR. REDSECKER: Mr. Jacobs, it gives me very great pleasure, indeed, to receive you as Chairman-elect of this Section of the American Pharmaceutical Association. The work you have been doing the past year has been such as to commend you most heartily to this Section as the only man capable of bringing it to active life. I take pleasure in presenting to you, gentlemen, the Chairman-elect of the Commercial Section of the American Pharmaceutical Association.

MR. JACOBS: I thank you, gentlemen, and members of the Section. At the same time it was my well-defined purpose not to accept office, on account of my health. But I have been persuaded from that, and for the next year will take great pleasure in acting and doing my best work for you. I am reminded of the great difference between the meeting a year ago at Minnetonka and this meeting to-day. Then I looked upon the nomination as something in the nature of a joke, having been at variance with the Section and having heard the free alcohol question and the cutter "cussed" and discussed, and having had brought to my mind that the average drug man approaches most questions with an apology, that he probably learns from early contact with the doctors. (Laughter.) I had little hope that anything should be brought out of the Commercial Section; but going into new fields and finding live subjects, I am pleased, indeed, to know that the work has been appreciated.

MR. REDSECKER: I have the pleasure to introduce to you, gentlemen, Mr. Bobbitt, the Secretary of this Section.

MR. BOBBITT; I thank you for this office, and I shall do my best to discharge the duties. I am pleased to be associated with Mr. Jacobs in this work. He has brought the Section out, and it will hereafter be an important factor in the Association.

MR. REDSECKER: I have the pleasure of introducing Mr. Mittelbach, one of the members of the Committee.

MR. MITTELBACH: Ladies and gentlemen, this is certainly a great surprise to me. I thank you; that is all I can say now. I will do my best.

Mr. Jacobs took the Chair.

Upon motion of Mr. Redsecker, the Section adjourned subject to the call of the Chair.

PAPERS READ BY TITLE.

CO-OPERATIVE MANUFACTURING BY RETAIL DRUGGISTS IN ONTARIO, CANADA.

FROM A LETTER WRITTEN BY JOHN A. CLARK, OF HAMILTON.

I give a brief statement, accompanied by the prospectus and by-laws of the history of a co-operative enterprise by a company composed of retail pharmacists, doing business in Ontario.

Prior to 1892 the matter of forming such a co-operative manufacturing company was discussed by the Massachusetts State Association, and a plan was proposed by a committee of that association. President H. M. Whitney was very much interested in the subject, and a strong advocate of the plan. In the spring of 1892 the writer requested and received information concerning the plan.

Tha scheme appeared to certain Ontario druggists appropriate for alleviating the difficulties besetting their callings. The Massachusetts plan was taken as the basis of the formation of a company entitled "The Ontario Chemists' Manufacturing Company," modified so as to adapt it to the requirements of this country.

The promoters of the plan printed a prospectus with the preamble as follows: "Owing to the demand which has continued for a very long time by the public, for simple household remedies for the cure of the minor diseases, it is felt by the druggists that the time has arrived when these remedies should be prepared with greater care, under the supervision of competent pharmacists, who having selected the formulas with great care, would have them prepared by a qualified chemist under the control of a board of directors composed of intelligent druggists. Thus a guarantee will be given to the public and medical profession, that these remedies contain all the active principles and the best quality of each drug that enters into their composition, so the public and the physician can be assured of obtaining *safe*, *reliable* and *pure medicines*, and be assured that they will contain nothing injurious to those who use them."

Application was made and a charter granted, authorizing a joint stock company with a capital of 1000 shares, $100 each. The company was formed with a board of directors—all druggists, and constitution and by-laws adopted, and executive officers appointed. The charter was obtained September, 1892. An issue of 200 shares of par stock was subscribed for and taken up.

Manufacturing was commenced and a line of preparations put on the market, all proprietary, under the name and trade-mark of the company, proceeding very economically. The selection of formulæ, designing of wrappers and advertising matter, was a labor of love on the part of the committee of the directors.

In 1895, the experimental stage of the company being passed, another issue of one hundred shares of stock was made at a premium of $15.00 a share These were all taken ; and again this year another issue of shares, one hundred, was made at a premium of $15.00 a share. At the present time there are 358 shares subscribed, being $35,800, and $15,000 paid in ; and in addition there is a reserve fund of $9,500, made up from surplus profits, after paying dividends of eight per cent. per annum and the premiums on the shares. Only fifty per cent. can be paid in upon shares under a recent resolution, so fifteen dollars per share is really a premium of thirty per cent.

As the business of the company developed, the Directors were compelled to remove from the premises first occupied, and they purchased a commodious warehouse for the use of the company.

There is manufactured a line of proprietary goods and toilet articles, also a small line of pharmaceuticals and specialties.

The Board has been very careful in extending trade. Goods are sold only to retailers who will maintain prices. A violation of sale prevents further supply of stock. The company is probably better able to carry out this plan than it would be in a country more thickly populated, and having a greater number of drug stores.

The laboratory and warehouse is in Hamilton, Ont., with depots holding stocks for supplying trade in Toronto and London, Ontario, and Vancouver, British Columbia. In every way the enterprise is in a flourishing condition.

The shareholders are located in business in various cities in the Provinces of Ontario and British Columbia.

REPORT ON THE DRUG MARKET FOR THE YEAR ENDING JULY 1, 1898.

COMPILED BY WM. O. ALLISON, NEW YORK.

Opium.—The opium market has, as usual, been under speculative manipulation during the year under review. Early in June, 1897, the price was $2.30, but the market was very firm, as it was a foregone conclusion that a duty of $1.00 per pound would be levied on the drug by the new tariff act. Nevertheless the price did not advance as rapidly as it was expected to. It remained at or about $2.30 to $2.35 until the middle of September, when the price quoted was $2.50. At the end of the month, $2.65 had been reached, which held until the latter part of November, when the market reached $2.70 to $2.80, re-acting late in December to $2.75.

The crop of 1897 had been of fair average volume, and the importations preceding the passage of the tariff bill had been very large, which was the cause of the failure of the market to respond to the new conditions created by the tariff bill for several months after the date of the act. Gradually, however, the stocks began to work down, and reports commenced to come in from the primary market, telling of damage to the growing plants by frost, rain, grout, etc. First they were not believed, but as time wore on the early reports were confirmed, and even more serious damage was inflicted. At the same time, it was not until early in February that the market showed signs of responding to the conditions created by the unfavorable crop reports. Dealers then quoted $2.80. Early in March, $2.95 to $3.00 was reached; early in April, $3.10; a week later, $3.20; April 25th, $3.25; early in May, $3.50. This rapid advance was due to buying by large consumers and speculators, based on the unfavorable crop reports, some estimates having named as low as 2,500 cases as the yield for this year. The market hung around $3.50, under bearish influence, until the first of July; but the close was very strong, previous reports of 2,500 cases as the yield having been confirmed.

As an evidence of how the situation is viewed in the primary markets, it may be stated that in the Karahissar district the government succeeded in realizing only 50,000 piasters for the opium tithes this year, as against 350,000 piasters last year.

Morphine.—The prices have, in a measure, followed those quoted for opium, but until quite recently the established quotations of the manufacturers have been shaded by dealers in some instances very materially, by reason of the fact that they were liberal purchasers before the new tariff became operative.

The bulk quotation of manufacturers, July 1, 1897, was $1.80. This held until early in October, when an advance to $1.90 was made. Early in December, makers advanced the price to $2; early in April to $2.10; a month later to $2.20, and in the middle of May to $2.30, which was the closing quotation July 1st.

Quinine.—The past year in quinine has been one of the most interesting in this article, partly by reason of the many fluctuations up and down. It will be remembered that the lowest prices on record were recorded in February, 1897, when the German brands were reduced to 15 cents, at which price the makers were without offer. This condition was in existence July 1st, the range of prices quoted by manufacturers having been 15 cents to 19 cents (the outside quotation for domestic brand). By this time the wild speculation, and largely increased legitimate demand of the preceding few months, had been pretty well satisfied, and an early advance was confidently expected.

There had been some friction between the American and the foreign manufacturers, over the attempt of the former to secure a duty on quinine, and the combination which had been in existence was strained to the breaking-point at this time.

The latter part of July the German brands were advanced to 17 cents, the American remaining at 19 cents. The American forced an issue early in August and advanced to 21 cents, leaving the German at 17 cents. It might be well to state that since the beginning of July dealers have been quoting above manufacturers; their prices July 1st were 18 to 18½ cents, and August 1st 19 to 19½ cents. A week later they advanced their price to 20 to 21 cents. They were enabled to obtain the prices by reason of the attitude of manufacturers in quoting without offer. The American manufacturers continued to lead the way, and the third week in September makers quoted 17 cents to 25 cents (the inside for German), and dealers were selling at 24 to 25 cents. A week later the German advanced to 21 cents, and the dealers sold at 23 to 25 cents. There was a spurt early in October, partly by reason of the conditions at the source of the bark supply, and makers' prices were 23 to 28 cents, and dealers managed to secure 28–30 cents, as the manufacturers who quoted the lowest prices would not sell except to regular consumers. The market continued to advance, manufacturers quoting 26 to 30 cents the second week in October, and 28 to 30 cents the third week. This was the price quoted by dealers. Nothing happened until the middle of December, when the price began to drop, and 26 to 30 cents was quoted as to brand, while dealers quoted 26 to 27 cents. In another week the outside quotation of manufacturers had been reduced to 28 cents, dealers dropping to 25½ to 26 cents.

At this time a combination of the handlers of bark in Amsterdam was formed for the purpose of advancing the unit price. The market remained unchanged until the third week in January, when all of the makers quoted 26 cents, dealers quoting 25 to 25½ cents.

Early in March there was a drop to 22 cents, manufacturers having determined to adhere to their policy of keeping the price of quinine as close to the price of bark as they possibly could. Early in April they reduced their prices to 18 to 20 cents, dealers quoting 17½ to 18½ cents. The market held firm on these prices, owing to the fact that war seemed inevitable, and an early and large demand for quinine was expected from the government. This gave speculators a cue, and they prepared to take advantage of any conditions that might arise that would favor manipulation. In the middle of April the inside price of makers was raised to 18 cents, dealers asking 18 to 18½ cents. In another week speculation had set in and large quantities were purchased here and in London for American account, forcing makers to advance their price to 22 to 25 cents, speculators having paid as high as 25 cents. Dealers had raised their prices to 25 to 28 cents. In another week makers were compelled to ask 24 to 28 cents. The speculation promptly subsided, owing to the failure of the government, or anybody else, to sustain the market. Dealers reduced their prices to 23 to 24 cents in the middle of May, and to 22 to 23 cents early in June, at which time makers dropped their prices to 22 to 24 cents; and a week later to 20 to 24 cents, dealers quoting 21 to 22 at this time.

The month closed with makers quoting 20 to 22, and dealers 19½ to 20 cents.

The market was steady, however, owing to the small margin between the cost of bark and the selling price of quinine, and to the fact that the government had been a liberal purchaser of quinine pills, thus compelling some pill makers to enter the market to supply their wants.

During the year three lots of the new Java quinine had been imported into this country, and sold at concessions of about 2 cents from the prices of the regular manufacturers. Pill manufacturers were the purchasers.

Cinchonidine.—The price at the opening was 10 cents, and the market had an upward tendency by reason of the fact that the bark had ceased to yield this salt and the available stock in the world's markets was not large. 12 cents was reached the latter part of August; 13 cents the third week in September; 15 to 16 cents early in October, and 15½ to 16 cents the middle of December. The year 1898 opened at 16 to 17 cents, but the demand began to fall off and supplies increased a trifle, so that a decline set in, which continued until July 1st. Changes occurred January 10th, when the market dropped to 15½ to 16 cents; March 14th, when 14½ to 15 cents was quoted; April 11th, when it was possible to buy at 13½ to 14 cents, and May 9th, when there were offerings at 13 to 13½ cents. This was the closing price.

Acid Carbolic.—The market has been devoid of interesting features, but the tendency of prices has been downward. The year opened at 25 cents, in pound bottles. The latter part of August, 24 cents was quoted, and in the middle of October, 23 cents; middle of December, 22 to 23 cents, which was the price at the close of the year.

Acid Citric.—The year opened at 33½ cents per pound, in kegs. Early in January, competition forced the price down to 32½ cents, but makers were compelled to advance the price the second week in May to 34½ cents, and the latter part of June to 35 cents, by reason of the higher cost of the raw material and the uncertainty, in the first instance, created by the war.

Alcohol.—Keen competition controlled this market throughout almost the entire year. Efforts had been made to bring about a combination of all the distillers, but they had not been successful. The price, July 1, 1897, was $2.29. The market stiffened up a little the latter part of August to $2.31, but dropped to $2.29 the middle of October and $2.27 November 1st. Early in December it had touched $2.26, and it was held down for a time by competition with molasses alcohol. Early in February it was possible to buy at $2.24. The distillers managed to secure $2.27 a week later, partly by reason of an advance in corn. Molasses spirit continued to press the market, and as low as $2.24 was named at the end of April.

About this time a new combination began to take shape. This included all of the distillers and distributors outside of the successor to the Whiskey

Trust, and had a working arrangement with the latter covering a period of five years. As soon as the combination had been perfected, the price was advanced to $2.31, which was May 1st, and $2.32 June 13th, which was the inside price at the close of the year for ten-barrel lots. It is claimed by the distillers that they had been selling below the cost for several months, and that the price to-day nets them a fair margin of profit on the cost of corn.

Bees-wax.—This market has not furnished many interesting features during the year. The opening price was 27 cents for yellow seed runs. The market declined to 25 cents the latter part of August, but recovered to 26 cents early in October; 27 cents the middle of November, and 27½ cents the first of December, by reason of the steadily growing scarcity, coupled with a demand from the bleachers. The year 1898 opened at this price, but in two weeks 28 cents was reached, and in the middle of April the price was 28 cents under the influeuce of the conditions already noted. The latter part of May the market touched 29 cents, but recovered early in June to 31 to 32 cents, closing the year at 30½ cents, with an easy feeling by reason of importations of foreign wax and a falling off in the demand of home consumers.

Borax.—The price has advanced steadily during the year, the advance in the duty from 2 to 5 cents per pound having had much to do with it. This enabled the California manufacturers to get a firmer grip on the American market than they had previously. Single barrels were quoted at 5½ cents per pound July 1st, 1897; at 5¾ cents a month later; 6¼ cents the middle of October; 6¾ cents the latter part of November, and at 7¼ cents early in January, at which the year closed.

Castor Oil.—There have been but two fluctuations during the year. The price quoted by makers was 12 to 12½ cents in barrels at the beginning of the year, but early in October they asked one-half cent more, reducing to the opening figure early in January, at which the year closed.

Cocaine.—The opening price in ounce vials was $2.75. In the middle of November it was advanced to $3, followed by an advance to $3.25 a week later, and to $3.50 the latter part of December. Early in March there was a decline to $3.25, and in the middle of April to $3, which was the closing price of the year. It is thought that the later declines were due to too rapid advances earlier in the year.

Oil of Cod Liver.—The feature of the year has been the influence of the short catch on prices since early in the spring of this year. The opening price in July '97 was $22. Early in September $21 would have bought, and from that time the market stiffened up and $22 was quoted the middle of September; $23 the middle of October, but $22.50 would have purchased early in December, $22 early in January, and $20 early in February. The winter had been an open one, and holders abroad had become quite willing sellers toward the close of the season. Their views stiffened somewhat as the reports of a short catch commenced to make their appearance, and the market advanced to $21 the middle of February, $22 a month later, followed by advances to $23.50 early in October, $24.50 a week later, which was the closing price of the year, although some sellers asked a higher price. The catch was a short one, and several large purchases were made for American account in the primary markets in May and June for early autumn shipment, at and above the prices quoted in the New York market. All indications point to a steadily improving market in the autumn.

Glycerin.—This market has been under the influence of keen competition at the West and a steadily advancing market for the crude in Europe. The year opened at 12½ to 13 cents in barrels in the New York market, which was the price until the first of January, when competition forced a decline to 12 to 12½ cents. The middle of March 11½ to 12 cents was touched, but early in May there was a sharp recovery to 12 to 12½ cents, based on shortage in the stock of crude and a rapid advance in the foreign markets. Some refiners were compelled to purchase the dynamite grade to supply their wants for crude, and, taking it altogether, the market for C. P. showed a decided improvement. The latter part of May there was an advance to 12½ to 13 cents, and the latter part of June to 13 to 13½ cents, in this instance barrels extra. During May and early June there was a brisk demand for contracts, consumers fearing a further advance by reason of the fine conditions which existed in all branches of the business.

Insect Powder.—The feature of the year has been the competition between the makers of powder, which has reduced the price from 22 cents, which prevailed on July 1, 1897, to 16 to 18 cents, as to brand, early in April of this year, which were the closing prices. Changes occurred early in February, when 17 to 20 cents was quoted, but late in March the price dropped to 16½ cents, and in April to 16 cents as stated.

Menthol.—The year opened at $1.85 to $1.90. The market advanced steadily to $1.95 to $2.00 the third week in August; $2.00 to $2.10 a week later; $2.20 the middle of October, followed a week later by an advance to $2.25 to $2.30, but there was a decline early in December to $2.20 to $2.25; January 1st $2.15 to $2.20 was the quotation, but the latter part of the month $2.10 to $2.15 would have purchased; the latter part of March $2.05 to $2.10, followed by a decline the latter part of April to $2.02 to $2.05, which was the closing price of the year.

The market throughout was influenced by foreign markets and a desire on the part of certain holders here to advance the price to a figure that would enable them to sell at a profit where they had been selling at a loss.

Quicksilver.—It is difficult to give much of a report on this article, as the prices fluctuate almost entirely by those quoted by the Rothschilds in London for the product of the Spanish mines.

The following prices are those at which dealers were sellers, although in most instances the official prices quoted by the agency were a trifle higher. The year opened at 53 cents. The market steadily declined to 52 cents in the middle of the month, to 51½ cents early in August, and to 51 cents in the middle of August, but at the end of the month it recovered to 52 cents, only to decline to 51 cents the third week in September, and to 50 cents a week later. The latter part of October it was 52 cents; a month later 51½ cents; middle of December 52 cents; a month later 51 cents, with a recovery at the close of the year to 52 cents. The latter part of January 51½ cents was asked, but the market from that time on steadily improved under the influence of a decline in production, followed later by fluctuations in the price of silver and the conditions created by the war. Early in February the quotation was 52 to 53 cents; two weeks later 53 to 54 cents; early in May 54½ to 55 cents; a week later 55 to 56 cents, while 57 to 58 cents was quoted the middle of the month. This was the closing price of the year.

Balsam Copaiba.—The opening price was 37½ cents for the Central American variety, and the fluctuations were 37 cents the middle of October, 39 cents early in November, 38 cents the middle of the month, and 37 cents the middle of March, but from this time on the market, which had been previously without interesting features, began to advance under the influence of pending hostilities and the belief that with the withdrawal of American steamships from South American trade, there would be a shortage in the supply. Early in April the market had reached 39 cents, and 43 cents at the end of the month, followed by an advance the first week in May. There was no scarcity of balsam, however, and the market began to decline, touching 45 cents the middle of May; 42½ cents the middle of June, closing at this price.

Balsam Peru.—The year opened at $1.90, followed by an advance to $1.95 October 1st, a decline to $1.85 October 15th, an advance to $2.00 December 15th, a decline to $1.95 January 1st, to $1.90 February 1st; but from this time the market began to recover on reports of a scarcity, and early in May $2.05 was reached, followed by an advance to $2.15 a week later, and to $2.20 by the middle of the month, but a reaction to $2.00–$2.10 took place the latter part of June, the market closing steady at the decline.

Balsam Tolu.—The market has been influenced by the law of supply and demand. The opening price was 55 cents, and the changes from that time were: 52 cents August 1st; 45 cents August 15th; 48 cents a week later; 46 cents September 1st; 45 cents a week later; 50 cents the latter part of October; 48 cents the middle of November; 45 cents a week later; 42½ cents early in December; 40 cents at the close; 30 cents early in January; 34 cents the middle of the month; 36 cents the first of April; 39 cents April 11th; 38 cents the latter part of the month;

44 cents early in May; 41 cents June 1st; 38 cents a week later, and 35 cents the middle of the month, which was the closing price. The last break was due to heavy arrivals when it was thought very little would come forward.

Anise Oil.—The market has shown a rather wide fluctuation, influenced partly by supply and demand and partly by speculative manipulation. The year opened at $1.60. There was a steady advance, the change having been to $1.70 the middle of July; $1.80 the close of the month; $1.95 early in August; $2.00 the middle of September; $2.05 a week later, the month closing at $2.10. The market broke in a few days and steadily declined to $1.875 early in November: $1.85 by the 15th of the month; $1.80 a month later, the year closing at $1.75. As low as $1.725 was quoted the latter part of January, and $1.70 early in March. Early in April $1.65 was the figure, the month closing at $1.60, while by the middle of May sales had been made at $1.675. There was a slight recovery thereafter, the month closing at $1.75, and the year at $1.725. This change occurred the middle of June.

Bergamot Oil.—The fluctuations in this essence were: $1.65 to $1.80 July 1st, 1897; $2.00 to $2.15 early in August; $1.90 to $2.25 the latter part of September; $1.80 to $2.10 early in November; $1.70 to $1.90 the middle of the month; $1.90 to $2.10 a week later; $1.80 to $1.90 at the close of the month; $1.75 to $1.90 early in December; $1.70 to $1.90 the middle of January; $1.90 to $2.10 early in March; $1.85 to $2.00 the middle of April, which was the closing price. The market was firm at the close by reason of advances having occurred in the primary market.

Lemon Oil.—The market has been depressed throughout the year by reason of the large stock of all grades that was imported before the last tariff act became effective, in the belief that a duty of 25 per cent. would be levied. While the foreign market has lately shown signs of improvement, there is plenty of oil in this market, which holds the price down.

The year opened at 90 cents to $1.10 for good to prime brands. The quotation was 90 cents to $1.05 the middle of August; 90 cents to $1.10 the latter part of September; 80 to 90 cents early in December; 75 to 80 cents the first of February; 95 cents to $1.05 the middle of February; 85 cents to $1.05 early in March; 80 to 95 cents the middle of April, which was the closing quotation.

Orange Oil.—During the year the market was somewhat depressed, but lately there has been some improvement, due to the improvement in the foreign markets.

The opening price was $1.65 to $1.80; early in September $1.60 was quoted, and the latter part of the month $1.50 to $1.65. The year 1898 opened at $1.50 to $1.75 as to brand, followed by an advance in a week to $1.85 to $2.00. There was a reaction the latter part of the month from $1.80 to $1.90, and a slight recovery on the leading brands the latter part of February from $1.90 to $2.00. The middle of April $1.85 to $1.95 was the ruling quotation, and the middle of May $1.75 to $2.05 as to brand.

Peppermint Oil.—The market has steadily declined, by reason of the large crop of last year and the falling off in demand; many of the consumers, especially those abroad, having been believers in lower prices. The fluctuations in the price of the bottled oil were as follows: The year opened at $1.45, but $1.40 was quoted the latter part of August; $1.35 the middle of September; $1.25 to $1.30 the latter part of the month; $1.20 early in December, and $1.15 early in February, which was the closing price.

Sassafras Oil.—The market has been influenced by supply and demand. The year opened at 35 cents, and fluctuations were as follows: August 1st, 38 cents; September 1st, 37 cents; September 15th, 40 cents; October 1st, 39 cents; October 15th, 40 cents; October 25th, 42 to 43 cents; November 6th, 41 to 42 cents; November 22d, 40 to 42 cents; December 13th, 39 cents; December 20th, 38 cents; January 10th, 36 cents; January 24th, 35 cents; January 31st, 34 cents; February 7th, 33½ cents; February 21st, 33 cents; February 28th, 35 cents: March 7th, 34 cents; March 14th, 35 cents; March 28th, 34 to 35 cents; April 18th, 33 cents; April 25th, 32½ cents; May 30th, 31 cents, which was the closing price.

Valencia Saffron.—The year opened at $10.50. The latter part of December it declined to $10.25, and thereafter the fluctuations were as follows: November 15th, $10; December 13th, $9.75; December 20th, $9.50; January 1, 1898, $8.90 to $9; January 17th, $8.75 to $9; February 21st, $9; March 21st, $8.75 to $9; but from this time on the market stiffened up in the belief that supplies from Spain would be cut off by the war. In the latter part of April $9.40 to $9.50 was quoted; a week later, $9.50 to $10, but then the market dropped in a few days to $9.25 to $9.50, followed by a decline the latter part of June to $9 to $9.25.

Camphor.—The fluctuations in American camphor in barrels were as follows: July 1st, 39 cents; August 16th, 37½ cents; December 20th, 36½ cents; December 27th, 35½ cents; January 10th, 34½ cents, which was the closing price. The only feature was the increased competition with the Japanese.

Buchu.—The feature of the year was the rapid advances in price of the short variety last Autumn, by reason of the extreme scarcity which existed for a time. The fluctuations were as follows: July 1st, 8 to 11 cents; September 27th, 9 to 13 cents; October 11th, 17 to 22 cents; November 15th, 18 to 20 cents; November 22d, 15 to 18 cents; December 27th, 14 to 18 cents; January 1st, 13 to 17 cents; February 2d, 9 to 14 cents; February 21st, 10 to 13 cents; March 28th, 12 to 15 cents; June 27th, 10 to 13 cents.

Dandelion Root.—The year opened at 9½ cents. The market advanced to 10 cents August 1st; 12 cents, November 6th; 14 cents, November

22d; but declined to 11 to 12 cents, December 13th 10½ cents, which was the closing price. Scarcity was the cause of the advance.

Jamaica Ginger.—The fluctuations in natural were: 18 to 20 cents, July 1st; 17¾ to 20 cents, August 16th; 18 to 18½ cents, September 6th; 17½ to 18½ cents, October 18th; 16 to 17 cents, January 24th; 13 to 15 cents, February 7th; 14 to 18 cents, February 21st; 13½ to 18 cents, April 4th; 15 to 18 cents, May 2d; 16 to 18 cents, May 9; 16 to 19 cents, June 13th; 17 to 19½ cents, June 20. The decline in the early spring was due to arrivals of new crop, but the subsequent advance was brought about by the higher prices which the London market paid and which forced the receivers here to ship their stock to London.

Golden Seal.—The feature of the year was an advance last autumn to 75 cents for small quantities, which prevailed for a few days. This advance was brought about by large purchases on the part of manufacturing consumers in the face of comparatively small stocks.

The fluctuations were as follows: July 1st, 25 cents: August 15th, 24 cents; September 27, 27 cents; October 4th, 30 cents; October 11th, 35 cents; October 18th, 40 to 50 cents; October 25, 62 to 75 cents; November 1st, 50 to 55 cents; November 15th, 48 to 50 cents; November 22d, 45 cents; December 13th, 40 cents; January 17th, 38 cents; February 7th, 40 cents: February 21st, 42 to 45 cents; March 13th, 38 to 40 cents; March 21st, 40 to 42 cents; April 11th, 45 cents; May 16th, 50 to 52 cents; May 23d, 48 to 50 cents; June 13th, 44 to 45 cents; June 20th, 40 cents.

Ipecac.—The year opened at $1.65, and the fluctuations thereafter were as follows: July 12th, $1.60 to $1.80, as to grade; July 19th, $1.70 to $1.80; August 16th, $1.65 to $1.75; November 15th, $1.70; November 22d, $1.75; December 27th, $1.80; January 24th, $1.90; February 7th, $1.85; February 21st, $1.95; February 28th, $1.90; March 14th, $1.85 to $2.00; April 25th, $2.20 to $2.25, which was the quotation at the close. The advance in the spring was due to a scarcity in the London market.

Jalap.—The fluctuations are within narrow limits. The market is featureless. The July 1st quotation was 10 to 11 cents, and the fluctuations were between 10 and 12 cents throughout the year.

Sarsaparilla.—The feature of the year was an advance in the spring, brought about by a shortage in the source of supply and a fear that the war would prevent shipments being made. Speculation was started here. While the highest prices reached were not maintained, the market is on a higher level than it was a year ago.

The fluctuations were as follows: July 1st, 5 to 5¼ cents; November 1st, 5⅛ to 5¼ cents; November 6th, 5¼ to 5½ cents; December 13th, 5 to 5¼ cents; January 24th, 5 cents; March 24th, 6 cents; March 28th, 6½ to 7 cents; May 2d, 7½ to 8 cents; May 9th, 8 to 8½ cents; May 30th, 8 cents; June 6th, 7⅝ to 8 cents; June 13th, 7¼ cents; June 20th, 7½ to 7¾ cents.

Senega.—The fluctuations have been as follows: July 1st, 22 to 24 cents; August 15th, 23 to 24 cents; September 20th, 24 to 25 cents; September 27th, 20 to 25 cents; October 18th, 27 to 30 cents; October 25th, 26 to 28 cents; November 1st, 27 to 28 cents; December 6th, 26 to 27 cents; December 13th, 25 cents; January 1st, 24 to 25 cents; January 31st, 23 to 23½ cents; February 7th, 22 to 23 cents; February 21st, 23 to 24 cents; April 4th, 22 to 24 cents; April 18th, 21 to 22 cents; May 2d, 22 to 24 cents; May 23d, 23 to 23½ cents; June 20, 22½ to 23 cents.

Celery Seed.—The market has been influenced by the situation at the source of supply, and at times by very low offers made by out of town jobbers.

The fluctuations were as follows: July 1st, 6 to 6½ cents; July 26th, 6½ to 6¾ cents; August 9th, 7 cents; November 15th, 6¾ cents; March 14th, 6½ cents; April 18th, 6 to 6½ cents; May 2d, 6¼ to 6½ cents; June 20th, 6½ cents.

Mustard Seed.—The fluctuations of the California yellow variety were as follows: July 1st, 2⅜ cents; August 9th, 3 cents; September 13th, 3¾ cents; September 20th, 3⅜ to 3½ cents; November 15, 3⅝ cents; December 6th, 3½ cents; January 1st, 3⅜ to 3½ cents; January 10th, 3 to 3¼ cents; February 14th, 3¼ cents; March 14th, 3⅜ cents; April 4th, 3¾ cents; April 18th, 4 cents; May 9th, 4¾ cents; June 6th, 4⅞ to 5 cents; June 13th, 5¼ cents The steady advance in the Spring was due to a certain shortage in the crop of California. The year closes with the situation very firm and all varieties much higher, with the prospect of still further advances.

OLD DRUG STORES MADE NEW.

BY C. H. BANGS, BOSTON, MASS.

I have been requested by the honorable Chairman of the Committee of that Section of the American Pharmaceutical Association devoted to Commercial Interests, Mr. Joseph Jacobs, of Atlanta, to prepare a paper giving my views on "Changing Old Drug Stores into New," and am asked to incidentally discuss the pros and cons of the advisability of placing the prescription department in the front instead of the rear of the store.

As the act of modernizing the old store is one that will probably involve a generous expenditure, especially if it is to serve to any purpose the object of a change, it is well, perhaps, before considering how it may be done, to consider first the reason for such action, and how it is more advantageous to promote the welfare of the druggist himself, bearing in mind that probably at least seventy-five per cent. of all druggists fail to recognize either the necessity or utility of any change whatever, so far as it applies to their own establishment. We may even go back a little farther and inquire the aim and object of the business itself. The first purpose of all business, the same as that of labor, is a means of livelihood; the second a competence; and third a degree of the latter, especially as it should apply to the druggist, that will allow of his retirement, in part or wholly, at the approach of age, from a pursuit far too onerous to bear, incumbered with the heavy weight of years. Incidental to all, and through all, pervades the eminently proper desire to stand well in the sight and favor of your neighbor; to be accorded the respect and confidence of those with whom you deal in sale or purchase; to avoid, as far as possible, that narrowness inculcated by years of petty dealings which leaves, alas! too frequently, an imprint of pennies on the soul.

To rise above this, to broaden your scope and horizon in the business world, to take your place as a merchant among merchants as well as a scientist, and thereby bring to all your craft a greater respect because by individual effort you have placed it on a higher commercial level—these are the real as well as the sentimental objects of business, for the attainment of which it must be treated in the most matter-of-fact fashion; for however sentimental the objects and results may be, business itself is absolutely devoid of any sentiment whatever. We must treat it as an abstract quantity, and entirely from its sordid side.

Therefore it is with an eye solely to the main chance that we must unfortunately make all our calculations. Whatever of respect, confidence or approval we may receive, and however flattering to our pride it may prove, it must be coldly calculated as to its value in dollars and cents as a means of drawing trade. A little disturbing to our dignity, perhaps, when acknowledged, but nations as well as individuals submit to it; wars are waged and standing armies are kept in order that trade and trade-relations may be maintained or improved. It is improbable that ever in the world's history has the competition in trade among the nations of the earth been so intense as at the present time.

This same intensity is shared by the corporations and individuals composing the business world.

The druggist has not been in the recent past, nor is he to be in the future, exempt from these conditions. If the old store is in any way a handicap upon his efforts, it is but justice to himself that it should be made to aid rather than to retard his endeavors. The present tendency of the times, largely promoted by an enormous amount of bargain-advertising, is in the direction of cheaper articles and smaller profits on regular goods.

In spite of this there is a current and well-based feeling that goods advertised at lower prices, unless of known value, belong to the cheaper grade. Especially is it true if the advertiser fails to sustain a high reputation for veracity and for the quality of the merchandise in which he deals. In other words, the people buy goods not solely because they are cheap, but because they are led to believe they are good as well as cheap. Probably three-fourths of the people are incompetent judges of the quality of what they buy, except of the standard or proprietary articles, and are dependent upon the statement of the seller. Their general impression of him and of his goods is largely derived from the appearance of his surroundings. The more valuable goods may be made to appear by their external surroundings, the more easily may they be sold. I know of no other way to give these goods an apparent added value, in order that the impression of quality may be sustained, except by statement or by external surroundings.

This, then, is what the modernized store must do, and do it far better than its ancient prototype, or it has failed to make good its claim or justify the terms. It must serve the requirements of the business with a more strict regard to economy of time and money. That is, three clerks should be able, with the same exertion, to do the work of four, a saving of twenty-five per cent. in a business requiring that number. It should admit of a far larger display of goods. These goods should be displayed solely with a view to presenting them to the public in the most attractive possible manner, always keeping in mind despatch and rapidity of handling. Goods poorly displayed look mean and cheap, while ordinary ones well displayed look much more valuable than they really are. Such is the force of association.

Do not think I am advising deception. Some people tell the truth as though lying, while others lie as though they were telling the truth. I simply want you to tell the truth, but with a degree of emphasis and with an amount of visible and collateral evidence that will entitle you to absolute belief. I am the advocate of that kind of a modern store which by its taste, style and character entitles a man to the highest respect and confidence of his immediate business world; one that will cause him to live up rather than down to the level of his environments. That this is generally the effect I have the most conclusive proofs. Respect, credit and confidence often outweigh cash in a business venture.

The modern store with proper conduct should give all this in the fullest degree. The modern store is one which advertises to the very best advantage the goods you have for sale, and your capacity to buy and sell them better than any of your competitors. The modern store is one which acts as a silent yet speaking witness of this fact. A great many stores are considered modern simply because they are new, while possessing only the slightest requirements of a really modern store. The three things most needed by the druggist may be summed up as follows: Trade, more trade, and still more trade. I speak of things possible. You want larger profits, and that is possible, too, but belongs in another chapter.

In answer then to the question how to change the old store into a new one, I would say make it beautiful, because by so doing you may sell more goods; make it display more goods, because again you can sell more; make it display them better and more tastefully, because their quality will thus be made more emphatic; make it so you can serve the greatest number of customers with the least number of steps and the smallest expenditure of time—this is economy. The average sales of the retail druggists, outside of paints and oils, I understand, are $5,000 per year. This being the case, the great want would seem to be, as already stated, more trade, unless a sharper economy is practised. Many economize at the little end to the point of meanness, but seemingly never attempt to economize at the big end where it can be done at the greatest advantage to the profit account.

The art of selling goods in the face of present competition consists mainly, if not wholly, in the art of advertising and in the art of displaying.

The latter is really a branch of the first. How well or ill your store does this as a rule embraces the whole length of the gamut between success and failure, so far as the store itself is a factor, and it is or should be made one of the main factors of success.

I am asked to discuss the pros and cons of the advisability of placing a prescription department in the front of the store. There are no pros when it applies to the druggists generally; there may be exceptions. Whoever depends upon his prescription trade depends upon the doctor, who is one to a thousand inhabitants. In other words, you have sacrificed a thousand chances of doing business to one; and while that one is a far greater likelihood, is it worth the sacrifice of your thousand? You say that does not prevent the business of the thousand, which is true; nor does the relegating the prescription department to the rear prevent the patronage of the doctor. It is only a question of which one possesses the right to head the procession, and I believe decidedly in the great majority represented by the people, without discrediting, in the least, the value of the doctor and his good opinion, nor do I believe they will be in any way forfeited by whoever tries to make the most of his trade opportunities.

A CRITICISM OF THE WAR REVENUE LAW OF 1898.

BY JAMES W. T. KNOX, PH. C.

The War Revenue law, in so far as it applies to medicines, is particularly odious to all pharmacists, both retail and manufacturing, who practice their profession in an ethical manner. We have neither time nor space to mention all the objectionable portions of it, but we wish to call attention to a few features which seem to us to be so vicious in their effect on the retail drug trade that we cannot help believing that their interpolation in the law (which was clearly intended to be modeled after the old law of 1862) was entirely malicious, and was the result of the machinations of the patent medicine interests, that have been engaged in fighting the druggists so vigorously for the past few years.

First, as to the general idea of a stamp-tax on medicines, we do not consider that it is based on correct principles of taxation. We hold to the broad idea that taxation should be imposed according to the ability of the taxed, and any form of taxation that collects as much from the man with one thousand dollars' worth of property as from the one with ten or twenty times as much, is unjust. This we hold to be one of the weak points of the law in question—the tacit assumption that medicines are proper objects of taxation.

Supposing that the consumer pays the tax, we may reason as follows: Medicines are articles of necessity—not of luxury—and are purchased by all classes of people. Wealthy people do not, however, buy ready-prepared medicines to any extent whatever—they almost invariably consult their family physicians, who write prescriptions for the medicines needed. Now, medicines dispensed on prescription and compounded by the druggist are expressly exempted from taxation. In this way the people of wealth, who are most able to pay the tax and ought to do so, escape it almost entirely, so far as their medicines are concerned.

The next class, those who are in moderate circumstances, sometimes referred to as "our great middle class," do not rely entirely on the physicians, but practice a certain amount of self-medication, for minor ailments particularly, and, therefore, buy a certain amount of ready-prepared or "patent" medicine. Consequently, people of this class bear a part of the tax, in no way proportioned to their ability, but more than that paid by the wealthy. So the tax on medicines falls on them less heavily than it should.

The third class, the poor, consuming perhaps, four-fifths of the entire amount of such goods, pay about that proportion of the tax. They rarely consult physicians, except in cases of severe necessity, because of their own inability to pay physicians' fees, and they resort more largely to self-medication than any other class of people. It is a fact, well known to druggists who have had opportunities for observation, that the chief sale of "patent" medicines is to the poor and the illiterate. Being poor, they are compelled to economize, or, being ignorant, they are more credulous than better informed people; consequently the mendacious statements of the quack advertisers appeal to them with greater force, and as a result of their poverty, or their ignorance, the sale of "patent" medicines is greatest among them. Consequently, the poor people who are least able to bear taxation, and who by all considerations of right and justice should not be overburdened with it, are made to pay an amount incomparably disproportionate to their means. We see from this that the stamp tax on medicines, if paid by the consumer, falls lightest on those who should pay most, and heaviest on those who should pay least. In other words, the tax is in inverse ratio to the ability to pay it, and is, therefore, unjust.

If we assume that the retail dealer pays the tax, the question naturally arises, why should the retail druggist be taxed in this way when the merchants in other lines of trade are not? Why not tax the gross receipts of the clothiers, the grocers, the jewelers, the dry goods, furniture, and hard-ware dealers, the saloons, restaurants, hotels, etc., etc.? It could be done as justly and as lawfully. There is no argument that can be advanced for taxing druggists, that would not apply with equal force to every other line of mercantile pursuit. But there are reasons why druggists should be exempt from such taxation to a great extent, if a general tax were to be imposed on merchandise. One of these reasons is that the drug trade to-day is in a less prosperous condition than most other lines of trade. With the advent of the cutters, who have destroyed the never-too-large profits of the patent-medicine trade; the advance of wholesale prices of these medicines; the encroachments of the department stores, selling perfumes, soaps, toilet articles and sundries in general at cost, there is not much left for the druggists but prescription trade, which is no bonanza anywhere, and in many places is hardly a considerable portion of the business.

If, then, it were possible to tax mercantile pursuits in proportion to their ability to pay, the amount falling on the druggists would of necessity be very small, by reason of the small profits made in the drug business, and the small volume of trade. Now, in contradistinction to all this, the druggists (whom we have shown to be the least able to pay), are singled out as the object of special taxation, amounting to from two and a half to four per cent. of their sales of medicines. If greater injustice than this has been heaped on any class of business or professional men in the last thirty years, we do not at present recall it.

And all this is because the law is wrong in principle, as is any law that places either a specific or an ad valorem tax on the necessities of life. Let us suppose that a tax had been placed on sugar, coffee, flour, or some other article of universal consumption. Poor people with large families would use more than the rich; they would, therefore, pay a larger amount of the tax. The result would be exactly as with medicines—the tax would be paid almost entirely by those least able to pay it.

On the other hand, let us suppose that instead of taxing necessities they had taxed some staple luxury of wide consumption, such as candy, for instance. That is an article that is very largely profit; with sugar selling at five cents a pound, and the standard brands of candies at fifty cents, it would seem that the makers could stand it to pay a tax of, say five cents a pound. At the same time, supposing it was eventually paid by the consumer, as in this case it certainly would be, the tax would fall on people who were able to bear it. Those who are best able to bear such a tax are the very ones who would be most apt to buy the article in the most liberal quantities. Hence, this tax would work directly opposite from that on necessities, *i. e.*, it would fall heaviest on those who should pay most, and lightest on those who should pay least, while the very poor, who should be exempt, would only need to refrain entirely from using it in order to obtain such exemption. And there are many other articles of which this is true, upon which a tax would be entirely equitable, and would also yield large amounts of revenue.

PROPRIETORS SHOULD BE TAXED.

We have gone into some detail to show that a tax on medicines is both unjust and oppressive, and works injury not alone to the taxed, but to the scientific as well as the pecuniary interests of pharmacy. It does not follow from this, however, that a tax on the patent medicine business would be unjust. Indeed, we consider that the secret nostrum business should be made the object of a special tax, provided it could be arranged so that the manufacturers could not pass it on for the retail druggists to pay, by advancing their prices.

The secret nostrum manufacturers constitute a specially favored class. They are at present in the full enjoyment of special privileges to which it is extremely doubtful that they have any right. Without contributing one iota to the cause of science or to the sum of human knowledge, they have by a strained and improper construction of the trade-mark laws secured what bids fair to be a perpetual monopoly, each in his own line of trade. Now the framers of the laws never contemplated anything like this; indeed, there is no country on earth that grants to a discoverer of a new and useful device a perpetual monopoly of his machine. After a certain time the right to make it and deal in it under its name reverts to the people from whom the grant originally came. But under the trade-mark law, as now abused by the patent medicine manufacturers, they adopt the name of the article as its trade-mark, and prevent others from dealing in it under that name. Neither are they compelled to disclose the secret of its composition; consequently this arrangement seems an ideal one, for them. They give the public nothing in return. Their goods are rarely if ever patentable, and do not represent any new and useful combinations, neither do they represent any addition to science, nor do they require any unusual skill in preparation. We repeat that any class so favored, taking all and giving nothing, should be made to pay a special tax. When we consider also that the profits made in this line of business must be very large, and in fact are incomparably greater than the druggists' profits, it would seem that there is further good reason for assessing such taxation. It is a pretty well-known fact that the greatest expense of marketing these goods is the advertising; the cost of material is inconsiderable; the cost of manufacture is likewise a small item, as in ninety-nine cases out of a hundred they are not made by skilled pharmacists, but by purely mechanical unskilled labor, which costs but little.

We believe that the fact of all these special privileges, together with the large profits and the monopolistic tendencies of these manufacturers, sufficiently designates them as proper objects for special taxation, while the onerous burden now imposed upon the druggists should be removed by amending the law.

Neither does it follow from the above that such special taxation should be limited to the patent-medicine makers. We would consider it unfair to tax only the makers of proprietary medicine and allow manufacturers of other proprietary articles to go scot-free. In our opinion, there is no consistency whatever in imposing a tax on medicine of all descriptions, and allowing all non-medicinal proprietary articles to go free. The manufacturers of the innumerable shoe dressings, stove polishes, metal polishes, inks, erasive fluids, mucilages, liquid glues, disinfecting fluids, table sauces and relishes, baking powders, washing powders, scouring and laundry soaps, etc., etc., enjoy special privileges by reason of the protection afforded by the trade-mark laws, and yet they have not been taxed at all. This is not as it should be. If medicines are to be taxed, then these other proprietary articles should pay their share; if medicines are to be exempted, then the makers of these goods should be taxed as a sort of compensation for the special privileges enjoyed by them at the people's cost.

Under no hypothesis that we can at present conceive of can we explain the reasons for the many ridiculous features of the present law. It would seem as if the law makers had been governed entirely by the jokes of a few alleged humorists about the large profits of the drug business, and had assumed, without further investigation, that it was able to stand whatever taxation they saw fit to impose. In addition, by allowing the representatives of the patent medicine interests to have their own way about changing certain parts of the law so that it would include everything the druggists are accustomed to put up, they succeeded in framing a bill that may well be called a model of stupidity, oppression and injustice.

AN AMBIGUOUS AND ILLOGICAL CLAUSE.

"The stamp taxes provided for in Schedule B of this act shall apply to all medicinal articles compounded by any formula, published or unpublished, which are put up in style or manner similar to that of patent, trade-mark or proprietary medicine in general. * * *"

If the framers of the law had purposely desired to make an ambiguous or misleading statement, they could hardly have succeeded better in doing so. We would like to have an authoritative statement telling us just what it means. What is the general style or manner of patent, trade-mark, or proprietary medicine? Who knows? This line of goods is put up in boxes and bottles of nearly every conceivable shape, in great variety of size, and with colors of unlimited variety of shades; bearing labels of all descriptions, from the severely plain to the most elegant specimens of lithographic art; either in cartons or not; either wrapped or not; in all presenting as great differences of appearance as inventive genius has been able to devise, from the simple reason that nearly every manufacturer has sought to avoid a general style or manner of putting up such things, if there be such, and to give his own goods a certain individuality by their very appearance. This, as we have already said, has resulted in so many different styles, so great heterogeneity, that there cannot be said to be any general style or manner further than this: that all liquids are put up either in glass bottles or cans; and all powders, pills, capsules, tablets, ointments, pastes, etc., etc., are put up either in boxes, bottles, tubes, according either to necessity or choice. In brief there is no general style or manner of putting up such goods other than every way in which they can be put up. Under a strict construction of the law, any medicinal thing put up by the druggist and bearing a printed label could be held to be taxable under this provision. That the framers of the law desired to make this provision so broad is hardly to be believed; therefore this section is most deplorably ambiguous. It would take a pretty smart man to draw a line of demarcation between goods which are put up in that style and those which are not.

From this crude and illogical separation of taxable from untaxable products, which is so ill defined that even the Commissioner does not know half the time whether a thing is subject to the tax or exempt from it, let us turn to the corresponding section of the Act of 1862 which exempted: "all uncompounded medicinal drugs and chemicals; all medicines compounded according to any of the national pharmacopœias; all medicines compounded according to formulas published in any of the dispensatories or text-books or formularies in common use among physicians and apothecaries, or published in a journal issued by a regularly incorporated College of Pharmacy."

Here is a line of demarcation so clear and well defined that a ten-year-old child of average intelligence could readily distinguish between taxable and non-taxable products; it is based on the rational, and the only natural separation of medicines into the secret, proprietary articles, on the one hand, and the open formula, non-proprietary medicines on the other hand. There is everything in favor of such a classification of medicines for the purpose of taxation. The first, or taxable class, is representative of the great moneyed interests; the second, of the retail druggists. The first stands for secrecy and unscientific methods, the second for the broad catholicism of pharmaceutical science; the first stands for quackery, the second for ethical pharmacy; the first stands for the principles that are antagonistic to the progress of pharmacy, the second stands for the advancement of pharmaceutical science. Clearly the men who framed the old law were not brought into such intimate contact with the persuasive methods of the patent medicine men as were those who got up the act of June 13, 1898, or the practice of pharmacy would hardly come off so well. The way the law now stands, a druggist is fined for practicing his profession in an ethical manner, by the imposition of a tax. It would be as just to tax the physician for every patient he sees, and for every prescription he writes; the lawyer for every case in which he is engaged, and every plea he makes; the minister for every sermon he preaches, and the civil engineer for every survey he makes. That is to say, if one profession is to be taxed, why not tax the others? If one is to go untaxed, why should not the others? It strikes us as being peculiarly unjust to discriminate against the pharmaceutical profession, which is decidely not the most prosperous of all.

We, therefore, believe that this law is a serious obstacle to the progress of pharmaceutical science, in so far as it ignores the principles of pharmaceutical and medical ethics. By failing to give due recognition to the truly ethical, non-proprietary, open-formula pharmaceutical products, and classifying them with a lot of unspeakable secret nostrums, a burdensome tax is imposed on true ethical, professional pharmacy. There is no need to go into extended detailed argument to prove that such is the case. Sufficient it is for our purpose to recall the fact that the patent medicine makers were instrumental in getting this part of the law passed, which includes the ethical with the unethical medicinal products. They have attempted in every way to prevent the druggists from competing with them, and in securing the passage of this portion of the law they have succeeded to an alarming extent. Inasmuch as whatever tends to benefit the unethical nostrum business is a drawback and hindrance to true pharmaceutical science, and whatever promotes the latter is in principle inimical to the former, we can easily see why the patent medicine manufacturers have spared neither pains, time nor expense, to pile up obstacles in the way of pharmaceutical progress by causing oppressive taxation to be imposed upon it. This is not the first set-back pharmacy has received at the hands of the patent medicine interests, and we venture to predict that it will not be the last.

DRUGGISTS ARE ORIGINATORS—NOT IMITATORS.

It is known, beyond all doubt, that the Proprietary Association gave a banquet shortly after the passage of the law, in celebration of what they were pleased to call their "victory," in securing certain changes in the bill. If it be true that they secured the insertion of this clause, and we see no reason to doubt it, we are justified in criticising it as the official utterance of the proprietors. Such we take it to be in fact. Therefore, the words, "style or manner of proprietary medicines in general," may also be considered from another standpoint.

If this clause is intended to mean medicines that are put up in packages of convenient size for retailing, together with an account of the appropriate medicinal application and directions for using, the proprietors are unjustified in claiming any originality in the matter. Long before patent medicines were known or thought of, the retail druggists of the country were accustomed to keep the well-known and, at that time, standard family remedies, put up in packages or bottles of appropriate size, bearing labels and wrappers indicating their uses, and ready for immediate sale. There was a demand for ready-made medicines at that time which the druggists supplied in this way. Later, when the proprietary and secret medicines were put on the market, they were put up in a manner and form similar to the general style of these non-proprietary remedies; therefore, it would seem that the claim of the manufacturers of secret medicines to exclusive ownership of a general style, through right of discovery, is not well founded. In fact, there is not the least doubt in the world that instead of the druggists having borrowed this style of putting up remedies from the manufacturers, the latter imitated the druggists and can lay no claim to originality as regards the idea of putting up medicines, in neat and attractive form. In the light of this fact, the accusations of the patent medicine men declaring the druggists to be swindlers, counterfeiters, and so on to the end of the chapter, merely because the latter see fit to handle their own preparations, put up in the style originated by pharmacists long ago, seem at least in bad taste.

"OPEN FORMULA MEDICINES" SHOULD NOT BE TAXED.

The most oppressive and objectionable feature of the whole law, is that portion of section 20 which brings open formula medicines and official preparations under its provisions. The wording of this paragraph is so comprehensive that it undoubtedly includes far more than the framers of the law intended. As it now stands, a druggist cannot sell paregoric without a stamp, if there is one word on the label indicating what it may be used for; the same is true of every other remedy which the druggists are accustomed to preparing for themselves and selling, even though without any idea of proprietorship in the same. The law simply includes everything of that kind, and the only safe way out of it is to comply by affixing the proper amount of stamps in each case. But as this portion of the law was aimed at the non-secret medicine business, and was undoubtedly interpolated at the instigation of the secret medicine manufacturers through the Proprietary Association, it seems that the druggists will have good reasons to remember the part played by them for some time to come. There is no reason why non-secret medicines should be taxed. We have already seen that a tax on medicines of whatever kind is unjust and oppressive, because it falls heaviest on those least able to pay. But of taxation of this kind, the taxation of non-secrets is particularly unfair, because it is a direct blow at the retail druggists, and prevents them from practicing their profession in an ethical, professional way, unless they pay a tax therefor. This law does not tax any other profession; it is, therefore, discriminative and may be characterized as class legislation. Under the old law of 1862, the druggists were not made to pay a penalty for practicing their profession; they were allowed to put up their own preparations and sell them on their merits, provided no claim was made for proprietorship, and there was no concealment of the formula. Under these broad and liberal provisions the druggists were enabled to compete with the secret nostrum makers on favorable terms, and most of them did so. Thus the fact that open formula, non-proprietary medicines were not taxed, operated to annul most of the objectionable features of the law.

WHY DO MINERAL WATERS GO FREE?

The original draft of the war revenue law contained a provision which subjected mineral waters to a tax. So far as we know, there was no protest against this by the druggists. It would have been a pretty good source of revenue, and would have been paid by people who would not mind it. Those who use bottled waters as a rule are able to pay a tax on them. As a matter of fact it is well enough known that the use of mineral waters among the poor class, and even among those in "moderate" circumstances, amounts to nothing. So there would seem to have been no excuse of that kind for removing the tax, although we believe a few very, very good people objected to the tax because it was a tax on temperance. This was a most brilliant conception indeed! But notwithstanding the apparently unobjectionable nature of the tax, it was not incorporated in the law that was passed. This of course is not a very great thing, but it forms another of the crudities and inconsistencies of an ill-conceived, unjust and oppressive piece of legislation, which we believe the law to be. The more closely we examine it, we cannot but wonder how one law of this length can contain so many absurdities and inconsistencies. Here was an article that should by rights have been made to bear its share of taxation, and it was allowed to go free; hundreds of other articles that ought never to have been taxed at all are taxed heavily. The numerous luxuries, bearing large profits and being extensively used, were not taxed, but the necessities of life, particularly those purchased by the sick and afflicted of the poorer classes, are taxed heavily. Inasmuch as the bill became worse and worse with almost every amendment, we should congratulate ourselves that it did not receive more so-called "deliberation."

RECAPITULATION.

To sum up, we consider the law, so far as it relates to the drug trade, wrong in principle and oppressive in effect. Its principle is wrong because it proceeds in a plan of taxation in direct opposition to the generally accepted and time-proven theories, by imposing the burden on those least able to bear it. It discriminates against the pharmaceutical profession by subjecting it to a tax, while it taxes no other profession. It protects the secret nostrum makers in their unwarranted abuse of special privileges. It places a tax on education and science and progress, and a premium on secret medicines and quackery. It wrongs the intelligent ethical pharmacists of the country, both retail and manufacturing, by including them in the same class and subject to the same restrictions as the patent-medicine quacks. It places heavy burdens on an already overburdened class of merchants, while it allows more prosperous ones to escape. It is ambiguous, crude and inconsistent. It is an ill-considered piece of legislation, that could not have been passed except in the excitement of war.

WHAT TO DO.

What is to be done? First of all, the law should be strictly complied with—a thing that hardly needs to be said to druggists, for they are law-abiding citizens. The next thing is to begin to agitate for a change in section 20, which will enable pharmacists to put up their own preparations or have them put up by others, and sell the same without being taxed. It is useless to attempt to secure the repeal of the whole law bearing on the drug business, but it may be possible to secure such changes in it as will give the druggists the same privileges that they enjoyed under the act of 1862, whereby they were permitted to practice pharmacy in an ethical way. Under that law quackery was taxed, but professional pharmacy was not. Every druggist in the United States ought to talk the injustice of this to his patrons. He ought to preach it in the highways and byways. He ought to point out to them the injustice which the law works to the retail druggists of the country.

If this is undertaken in an earnest spirit by the 40,000 retail druggists of the country, with the co-operation of their friends, it is very likely that the modification can be had in the next session of congress. It will not do to sit down and let this thing go on until the whole act is repealed. It may be twenty years before that is done. The proprietary medicine people have shown that they knew a thing or two about influencing legislation against the retail drug trade—let the retailers show them that they know a few things about getting oppressive legislation repealed. As we have already said, if the retailers take up this thing and work at it actively, perseveringly, persistently, patiently, they may be able to accomplish something toward regaining their rights. But if they sit down and give up to despondent expressions, as "Well, it cannot get much worse," nothing whatever can be accomplished. The desired change could be affected by striking out the italicized words of the following clause from section 20:

"The stamp taxes provided for in Schedule B of this act shall apply to all medicinal articles compounded by any formula, published or unpublished, *which are put up in style or manner similar to that of patent, trade-mark, or proprietary medicine in general*, or which are advertised on the package or otherwise *as remedies or specifics for any ailment, or* as having any special claim to merit or any peculiar advantage in mode of preparation, quality, use, or effect."

We would therefore suggest that the American Pharmaceutical Association take steps to organize the opposition to this law, by appointing a committee duly empowered to agitate for its amendment, to the end that at the next session of Congress the law may be changed so as to restore the rights of the retail druggists of the United States of America.

WOMEN AS PHARMACISTS.

BY MISS M. C. DORR.

Appreciating highly the honor of representing my sex in a profession heretofore restricted to, or usurped by the sterner sex, I wish to state for the benefit of those who have asked my opinion on the subject, that I see no reason why a woman is not thoroughly competent to become a pharmacist.

The success which women have attained in the study of medicine is an argument in favor of their ability to succeed in pharmacy as in other professions. There are certain qualifications and attainments that are positively essential, and observation has taught me that youthful experience is perhaps of highest importance. I attribute much of whatever success I may have attained to early experience. My own business career began at the age of sixteen.

The pharmacist who is called upon to fill a prescription should be equally as qualified as the physician who writes it, since it frequently happens a wide and more comprehensive knowledge is called into requisition to prevent mistakes that might prove fatal in effect. The necessity therefore is obvious for a thorough course of training, and a period of four years at least in my judgment should be devoted to study, to be followed by years of experience if one wishes to become an expert pharmacist. One should be able upon glancing at a prescription to perceive at once the medicinal properties and effects of each ingredient, also their combined influences when chemically united, and also a knowledge of the human system and the functions of the different organs, both in healthy and diseased conditions. In order to attain even a moderate degree of proficiency in a profession combining so many branches, there must, of course, be some natural ability.

Experience has taught me that a keen practical ability for business and an indomitable perseverance, as well as an inexhaustible stock of patience, are fundamental characteristics of a successful pharmacist. It is necessary also that the woman who aspires to be a pharmacist should be endowed with physical strength and power of endurance, for she will be expected to serve day and night and Sunday too, sometimes with but poor remuneration for the number of hours served.

Strictly temperate habits, in order that the brain may be active and alert at all times, and a cheerful disposition, are qualities in which women have the advantage, and these, perhaps, over-balance, in the end, the business tact and superior physical strength, which is the boasted pride and glory of the other sex.

That the field has been left to the other sex is due to several causes: The drudgery connected with the early stages of clerking, perhaps, has some weight in the matter. Whole days devoted to washing bottles, bottling medicine and opening heavy boxes of goods are not occupations to be contemplated with zest by the average maiden, although she might exhaust more physical strength daily on a piece of wood-carving with zest and satisfaction. There are but few men who are willing to employ girls and send them out at all hours and to all kinds of places, and that is expected usually of beginners.

Location too has some bearing on the subject, as there are neighborhoods in which it would be impossible for a woman to conduct business of this kind successfully. The study of pharmacy affords a broad and interesting field for research, and certainly tends to broaden the view of life, as scarcely a day passes that does not reveal some new and unexpected phase of human nature.

That women should prefer to purchase drugs and consult with one of their own sex on matters which have interest for them alone, is the most natural thing in the world. A number of well-informed and capable women are now traveling for eastern drug and sundry houses, and have been very successful. I am sure of not wishing to give offense to any of my worthy sisters by my next remark, when I tell them that I am speaking from personal experience. It occasionally happens that physical strength is fearfully tantalizing when it seeks to exert itself overbearingly, but our verbal capacity in such emergencies rarely fails to defeat the enemy.

A word of warning may be in place to that fortunate class known as "good-looking girls," which I hope will not dampen the ardor of any young women who wish to sacrifice themselves to the cause. A woman is generally sympathetic, and is made to suffer accordingly. We are told that there is nothing so destructive to beauty as the constant facial expression of emotion, and there is no discharge in this war. A young mother rushes in and tells you excitedly that the medicine you have sold her has saved the baby's life; you beam with sympathetic smiles, seaming your face with upward lines, to be known later on as wrinkles. The next customer is a poor old man who tells you in agonizing tones that his gout is unbearable: your face is immediately distorted with lines in the opposite direction, as if you were the real sufferer. Not so with the male clerk—he is polite and obliging, but philosophically casts upon both the mother and the old man the same stereotyped smile, and suggests the most expensive remedy known.

The chivalric poet who wrote,

"The world was sad,
The garden was a wild,
And man, the hermit, sighed,
'Till woman smiled,"

I am sure would not have advised the busy lady pharmacist to smile in sympathy or from amusement, beaming on every caller at the store—nor yet to destroy her capacity for smiling by spoiling her beauty with a constant expression of sympathetic pain on the face. So, I contend that beautiful women can be pharmacists without spoiling their beauty, either of person, disposition or character.

A VOLUNTEER PAPER FOR THE COMMERCIAL SECTION.

BY H. M. WHITNEY, BOSTON, MASS.

That the Commercial Section of this Association is for the purpose of considering all matters pertaining to the purely trade interests of the members of the American Pharmaceutical Association, and particularly of the retailer, should be admitted without any argument. That these matters should be considered by a broad, just, fair and calm recognition of facts, not of rumors or local disturbances, should also be admitted. We are a national body, and our discussions and actions will be wiser, more effective, and with better results, if we take in the conditions as they exist, not alone in our own special vocation and in our local environments, but in the general conditions of every trade interest in this or other countries. The scientific, educational and professional features of our calling may not be easily lost sight of in our deliberations, but they do not apparently play a very important part or exert a potent influence upon the simple question of trade or commercial interests we are considering.

An absolute honesty of purpose and effort, with satisfactory relations, recognized and appreciated service, were twenty-five or fifty years ago a marked feature of the regular drug store. We were then, as now, charged with making very large margins of profit, yet every one appeared to be satisfied that the information, acts of kindness, and simple suggestions how to prepare and use a drug were worth the price paid. Our relations with the manufacturers, proprietors and jobbers were pleasant, fairly profitable and satisfactory. Changes many and peculiar have come to us and also to nearly every other trade or commercial interest all over the world. We perhaps feel the changes more keenly from the fact that the *personal responsibility*, even to hazard of life itself, is ever with us; and the very small volume of business we can do legitimately with due regard to safety, prohibits the rapidity and volume of business that properly can be accomplished in other callings by the aid of steam, electricity and machinery.

True, these potent powers are used to some extent by the large manufacturers and proprietors, but what has been the tendency? Competition has become so powerful a factor that the absolute integrity of the old days and their high moral code have in too many instances become obsolete. Is health, even life itself, of so little value that it must join in the mad rush and whirl of this age, and risk all upon the stereotyped steam-made products? Sometimes it has seemed to me that the physician and the pharmacist were in such haste, goaded on by the fearful consumer of time, the commercial traveler, that they were almost forced to prescribe and dispense specialties so-called, and the people, eager for anything, regardless of results, provided the medicine was sugar-coated, attractive in appearance or well advertised, were better pleased than with the early methods. And this condition of gullibility, in which most of us have more or less stock, and upon which novelties and specialties thrive, is apparent in nearly all commercial transactions. Banking, transportation, musical instruments, bicycles, manufacturing, farming, sewing machines, cereals, healing, eating, drinking, and dressing, all have their novelties or fashions. Competition and strife in all conceivable ways up to the border line of ruin, enters every avenue of promise. That this is the general condition all must admit, and to such an extent is it carried that nearly every branch of industry or trade has its special organization or association, its trusts or combine for self preservation. So we are not alone in our troubles. The question or point with us is, what are we going to do about it? Before we attempt to solve so hard a problem, let us consider the cause of our present condition, and that may suggest a remedy.

As distributers of proprietary goods and specialties in our line, we are brought in close contact with the consumers and were in close touch and sympathy with the makers; but of late years bars have been put up, a barrier has been raised to protect and preserve the gradual but surely disintegrating business of the middle-man, called the jobber. To the relief and comfort of the large proprietors and manufacturers, he has for a consideration been acting as clerk or porter, and that practically is all he is to-day.

In the early days, when transportation was by canals and mule teams, the jobber was a convenience and necessity; but with the modern and improved conditions the process of disintegration began. Glassware, essential and fixed oils, paints and dye-stuffs, corks, spirits, druggists' sundries, etc., have become specialties. Large pharmaceutical manufacturers and proprietors (large importers and consumers of crude drugs) have become vendors of drugs, and the necessity or usefulness of so many jobbers is practically concluded. A heroic effort was made to prolong the life of the middle-man by the so-called rebate plan, but the generally-accepted theory of bringing the producer and consumer nearer together has made the road of the jobber a hard one to travel.

This effort has nearly cost the financial life of every reputable and distributing pharmacist in the land, has increased the number of proprietary goods, almost demanding a second flood to swallow them up, has caused a coldness, if not more, between the proprietor and distributer, cheapened and debased the goods, "100 doses for $1.00," to, in some instances, "200 doses for $1.00."

How long shall the 40,000 be made to suffer that the few hundred may live who do not do as they agree, and seem to delight in fooling their woefully mistaken rescuers? Also aiding and encouraging grocers, department stores and others to join in the wholesale destruction of those who have been their salvation, and the only legitimate distributers of goods without a pestilential and decaying annoyance to the makers.

How long will you, retail pharmacists, submit to this torture and life-disturbing operation, before entering every local field with your own goods, which your individual patrons will hail with joy and grateful songs of welcome !

It is not so long ago that the wholesaler did not carry proprietary or patent medicines. The leading proprietary goods were consigned and sold to the retailer direct. The supply and demand became such that strictly patent medicine jobbing houses were established, and did not sell goods at retail. The wholesale druggists, finding that well-advertised proprietary goods were largely used in preference to crude drugs, began to carry them in stock, and sell them at retail, and cut the jobbing price so close that the patent medicine house put in drugs. And so the war raged, both putting up their own proprietary goods. The retailer, calmly looking on the contest, followed the example of the wholesaler, and began to try his hand at specialties of his own, when came the fearful howl ot substitution !

What are the facts about the substitution of which we hear so much said? When the department and cut-rate stores began, the excuse given for not heeding the protests of the retailers was, "They won't substitute, but will sell the goods called for ; that will be better for us." In view of the facts to-day, it is idle to dwell upon the charge. To my mind the excuse was not at the time valid, and was an unfortunate one.

Many of our customers for these fearfully cut goods are now regretting the change in price, as they insist the goods are not what they were. It is not strange that any goods, particularly medicines, sold at a discount of 20 to 50 per cent. from regular rates, should soon raise the question of quality.

Some of the most successful men of to-day in the proprietary line came from the ranks of the retailer, and yet the wholesaler insists upon dictating terms to the proprietor and distributer, adopting the sly methods of the Indian, "Heads I win, tails you lose."

Now I have no wish or desire to antagonize or in any way disturb or annoy the jobber or proprietor ; on the contrary, I should be more than pleased if we could all live in peace and harmony. Possibly the pharmaceutical manufacturers and proprietors, failing in their efforts through the jobber and retailer to command as large a clientage as they desire, have sought the aid of the physician, and may follow the lead and teaching of the department stores and deliver direct, express paid, to the consumer. If this be so, so be it. Then comes the survival of the fittest.

In all honest and kindly feeling, as I see it, we are to-day face to face with the jobber and proprietor and their challenge, "Defend yourself." One insists upon a clean ten or fifteen per cent. which no one else can have; the other says, "You are a substitutor, your usefulness has gone." Shall we longer try to plead for justice, or bravely accept the situation?—work honestly and intelligently, as we can for ourselves and the good of our patrons, present our own goods that we know all about, and refuse to handle others, or if we handle them, sell at market rates or real value, if there is any?

For years we have served faithfully both jobber and proprietor. Our shelves, counters and windows have been freely used to exhibit their products, and tons of advertising matter have been given away. Many of these goods have become household remedies through us, sometimes I fear with a feeling of shame and a fearful tax upon our self-respect; and through us, as the only possible way of securing a recognized standing, have many men become multi-millionaires. If we are to be punished for every idle word, how terribly some of us will suffer for things worse than idle words; for selling goods, I prefer each of you should decide for himself. Goods of our own make, that we know all about and whose value does not depend upon printers' ink, will help us out, and I trust keep us in the ranks of the good. It does seem to me we have been tools and patient servants long enough. As perhaps was natural, the jobber has tried to make us feel, what has often been said, "There is only the commercial side left for the apothecary, and he may as well accept the situation." And this, to my mind, is the hardest and most unkind, as well as unjust, reflection upon our scientific Section. It practically declares that our colleges of pharmacy, and all educational institutions beyond their power of making a mere tradesman, are a farce.

Now let us as briefly as possible review the situation. From the reports of the Jobbers' and Proprietors' Convention held at Richmond, Va., in October of 1897, I make brief extracts only.

Mr. Englehardt of Chicago says, "It is my belief, and I believe that of every retailer in the country, that relief from themselves is impossible. Relief must come, and it must come first through action by the National Wholesale Druggists' Association; and secondly, by the Proprietary Association. If the retail drug trade of this country is to be saved from further demoralization and further loss, its salvation must come from this organization and its brother, the Proprietary Association, also. I feel, therefore, I am expressing the judgment of the retail druggists, when I say that they are looking to you now to devise some plan to afford them relief. They cannot help themselves—they appeal to you for help."

Mr. Carter replies, "All I can say is that it seems for many years we have tried and struggled to do something for ourselves as well as for the retail trade, yet we have not succeeded in doing as much for ourselves as we would like, and we do not think we have done as well for the retail trade as we should like—in fact, hardly anything; but that is through no lack of will on the part of these general assemblies, but on account of the seem-ing impossibility of doing anything. It may be that out of the joint brains of the two conventions something may come later that will help our friends, the retailers, and thus, as the gentlemen have assured us, it will be for our benefit as well as for their own; but immediately I do not see anything of real benefit that can be done for the retail trade."

Mr. Sourwine, of the Michigan Pharmaceutical Association, says, "We have put our whole souls and hearts in this matter, and we have decided that something must be done. We have also corresponded with the pharmaceutical associations of other states, and we find that they are in hearty accord with us. I believe that the hard times we have experienced in the last few years in the retail drug trade are directly traceable to the cut-rate business. It is expected not only by my state, but I believe in every state in which this cut-rate business is carried on—and I believe it is carried on in every state."

Mr. Kline replies, but saves his remarks for a later hour.

Mr. Baker of Richmond, our delegate, made a very happy and courteous speech, saying, "I feel it an honor to be a member of the American Pharmaceutical Association. I am its oldest member and its first vice-president; I take great pride in it, and I am sure that if the other members of our delegation were here, they would be rejoiced to meet with the members of the National Wholesale Druggists' Association, inasmuch as we all belong to one family. It is estimated that 90 per cent. of the members of the American Pharmaceutical Association are retail druggists, and I feel here very much like a man going from one room of his house to another; we are all under the same roof. I feel at home; and I think I voice the sentiments of our delegation when I say so."

Mr. Noyes, of St. Paul, says, "It is no new experience for us to have a representative from the oldest, the largest, the most dignified and the most progressive pharmaceutical association in the world, the American Pharmaceutical Association, whose delegate we have just heard. It is always a pleasure to us, because we believe that our friends, the American Pharmaceutical Association, are heartily with us. . . . I do not believe that the salvation of the retail druggists of the country is coming through us; I believe if they are going to be saved it will have to come through their own exertions; I believe that their ability to succeed depends upon their unity and integrity of purpose. There is one word more to say, and that is, the American Pharmaceutical Association is divided into several Sections; one attends to the theoretical part and one attends to the business part; it is only the business section that is astray, and is interested in what Mr. Kline's report will contain. I think theoretically they are right." (Laughter.)

The remarks of Mr. Daniel Myers, of Cleveland, were practically the only words of appreciation, kindness and encouragement. "As I read the report of the National Wholesale Druggists' meeting at Richmond, I fail to find the slightest hope, other than a decided and emphatic challenge, 'Help yourselves. We have all we can do to protect the jobbing trade,' and I guess that is a fact."

Dr. Pierce, after pleasantly alluding to the prosperity of the Proprietors' Association, said, "I can assure you that if there is any one thing that more than another has a tendency to give the proprietor the nightmare, disturb his peace, and give him a fit of indigestion, it is a pressing invitation for an extra five off. If the jobber is giving 'indigestion, nightmare and disturbing the peace of the proprietor,' pray give me some names for what he has done to the retailer. Is it any wonder the jobber feels he has all he can do to float himself? He claims the cost of doing business is from 7½ to 10 per cent., and I do not think he is unreasonable in asking 15. But how about the retailer, whose cost of doing business is from 20 to 25 per cent., and who, by the acts of the proprietor and jobber, is forced to sell these proprietary goods at from 1 to 10 per cent. advance —in many cases at a loss? I unhesitatingly charge the proprietor and jobber with the present conditions. It is too absurd to assume that the retailer is selling to department stores, or cutters, or sharpening the knife which has brought him so near to ruin."

Surely the several delegates representing the retail pharmacists respectfully and strongly urged our claims, and in turn received words, and only words. How often we hear or read the words of the proprietors, "We bring customers to your store by advertising" etc. Is there any satisfaction or help in selling their goods at a profit of 5 per cent. when it costs 20 per cent.? Do not the department stores and cutters put up and sell their own goods?—and why should we be advertised, called substitutors, and the press subsidized to antagonize every retailer? If the proprietor feels that the day has gone by to get the prices he has placed upon his goods, and prefers to have them sold as they are; if he has protected the jobber for fifteen years or thereabouts, and is satisfied with the results; if he wants the services of the retail pharmacist, why should he decline to protect him, and allow his goods to be kept and sold for advertising purposes by those who cheapen them? If he does this and will not change, we are powerless to help him.

It is boldly claimed by those who sell these goods at the market price that they are not cutters, but that the retailer, who has been trying to maintain the proprietor's price, is the cutter when he sells for less than the regular price; and I incline to the opinion that the charge is a correct one.

The situation, then, is this: The jobber wants and gets protection, or rather has had it; but, alas! he finds the rebate plan has so many weak points that he begs for an extra five off, and insists that all the goods must go through his hands, none directly to the retailer.

The proprietor, by failing to maintain his price, permitted his goods to be sold at cost, apparently accepts the situation as well enough for him, and in view of the general trend of business, declines to interfere.

If in this hasty effort to present fairly the facts, as they actually exist, there is even an apparent unkind thought, I am sorry. My purpose has been to discover if possible a single sign, promise, or even indication of relief along the lines on which we have been working. Our conviction that 20,000 pharmacists, half our number, would during the next twenty years be of more service to the proprietors, as their friends, than they can be in the present condition, does not seem to be considered. They have switched off from local to through lines, following the monopolistic and metropolitan trend, saying,

> "I don't want to play in your yard,
> I don't like you any more.
> * * * *
> You can't holler down our rain barrel,
> You can't climb our apple tree."

The successful men to-day seem to be those who have prepared their own yards, planted apple-trees and many vines of improved quality, goods that sell themselves without ads. and the rain barrel—but it's ads. brings the customer.

"Go thou and do likewise." Keep up with the procession or get left.

Combines are easily made and are very helpful in bringing you together. Encourage local associations whenever possible, sending as many delegates to these meetings as funds will permit. Immediate action is a necessity. The people demand drugs and will have them. It is not in the power of science or education to prevent their use in some form. History plainly shows, and every observant person must admit that, every living thing from the plant to the human family seeks relief from real or fancied pain or trouble. It is not only our privilege, but *positive duty*, to render loyal service to those who rely upon us. Shall we do it?

THE COTTONSEED OIL INDUSTRY IN GEORGIA.

BY JOSEPH JACOBS.

I have thought that our Association, in this section especially, might profitably from year to year devote some of its time to the consideration of some of the industries that produce the articles that form or which might form the subject matter of the drug trade, directly or indirectly.

In the present paper I shall endeavor to give some account of the cotton seed oil industry, confining the statistical portion of the article mainly to my own State, Georgia, as this is one of the typical Southern States, and what is said in that connection is measurably true of the other Southern States of our Union; though the industry is by no means confined to the South.

While the Southern States of our country now principally supply the world with cotton, the cultivation of the plant is not at all confined to that section. Egypt, India, Australia, portions of China, and many of the States of South America, as well as many of the islands of the seas, cultivate the variety of the gossypium plant known by the common English name "cotton."

There are some who suppose that the use of cotton as a material for fabrics began with the introduction of slavery in this country, but the history of the plant shows that many of the ancient nations were skilled in the weaving of cloths from this fleece of the fields, and authoritative writers state that long before the Christian era, the older peoples of the East could weave it into filmy fabrics of far more delicate texture than even those of the finest of this day.

It is said that the value of the seed known to the ancients was both in the oil and the meal; that the oil was used, but not for its edible purposes, and that the crushed seed were fed to their cattle. The Chinese, it is related, expressed the oil from cotton seed at least 500 years before Christ.

In England there are now about 25 oil mills in operation, consuming principally black seed of the sea-island plant transported in ships from Egypt, and the Hollanders are perhaps as largely engaged in the industry. The oil has been made in those countries for many years.

The superiority of the oil made in our Southern States is due partly to the fact that the seeds can be secured fresh from the fields, near the oil plants, whereas in England and Holland some months are often required to bring them over in sailing vessels. Besides, the English and Holland oil is not so clear as ours, because the seed there treated is Egyptian or Indian, and is not decorticated, owing to the difficulty of picking it. Our cotton seed parts with its fibre more readily, and in every way yields better to treatment.

The first mill for the manufacture of the oil in this country was perhaps the one near Columbia, S. C., mention of which is found as early as 1826; though it was probably operated prior to that date. One of the mills in New Orleans before the war used a 35 H. P. steam press, producing 500 gallons of oil and five tons of oil cake a day. It required, as stated in the Southern Farmer and Planter, about 15 tons of cotton seed to produce this amount of oil and cake, or each ton yielded about 40 gallons of oil and 700 or 800 pounds of cake. In Memphis, Tenn., it was also made in large quantities. At this period we find the following published statement of the uses of the oil: "This oil, refined by a secret process, is made of two qualities—the best used for illuminating and lubricating purposes and for currying leather, and the inferior for making soap equal to the palm soap." Cotton-seed cake was then considered of about equal value with flax seed cake.

Prior to the war the cotton seeds were very little used as a stock feed. Some farmers sparingly used them after boiling. They were abundantly applied as a manure, but only in their uncrushed condition. Browne, in his Field Book of Manures; says: "They abound in a mild oil, and are accounted very nutritious after the oil is expressed, a bushel of seeds weighing 30 pounds, and yielding 2½ quarts of oil and 12½ pounds of fine meal. The oil cake is very brittle, and breaks down much more readily than linseed cake. The taste is not unpleasant, and it is stated it can be used with success in fattening stock."

In the Patent Office Reports, 1855, page 234, can be found "some chemical researches on the seed of the cotton plant," by Prof. Chas. T. Jackson. He refers to a patent taken out by D. W. Mesner for separating the "hulls" from the cotton seed. Analyses are given of the oil, the seed, the cake, etc. Prof. Jackson employed ether to separate the fixed oil, and it was found that 100 pounds of the dried, pulverized seed gave 40 per cent. of pure, fatty oil. The specific gravity of the oil is given as 0.923, which, he states, is the S. G. of pure whale oil. He recommended its use for lubricating machinery, burning in lamps, and for making soaps, and suggested its use as a substitute for olive oil and use as a salad oil, it having no disagreeable odor or taste. On examining the cotton-seed oil cake he found that it possessed "a sweet and agreeable flavor, and was much more pure and clean than linseed oil cake." One hundred grains of the seed leave 60 grains of the oil cake. This cake examined for sugar was found to contain 1.1 grains, and for gum 35 grains. Iodine gave no proof of any starch in the cotton seed, nor in the oil cake.

Since the war, the cotton-seed oil industry of the South has grown to immense proportions. The number of mills has increased from four in 1867 to over 300 at the present day. In 1872 the export of cotton oil only amounted to 4,900 barrels, in 1896 about 30,000 barrels, and the present product amounts to about 28,000,000 gallons per annum, worth about 30 cents per gallon, causing the cousumption of about 800,000 tons of cotton seed. The product goes to nearly every European port, to Africa, Australia, India, the South American Republics, West Indies, and Canary Islands and Japan. The Germans and Americans are said to prefer animal fats to vegetable oils, contrary to the taste of all other civilized people. The capacity of the various mills varies from a consumption of 250 tons a day by the larger mills to 15 tons by the smaller. The total capacity of the Georgia mills is about 2,000 tons a day, which, if run on full time, would consume more than the total seed product of that State if all were available; but the fact is that much of the seed used by the Georgia mills is brought from Alabama, Mississippi, Florida and the Carolinas. The annual output of Georgia from the 200,000 tons of seed, is about 150,000 pounds of oil, 70,000 tons of meal, 8,000 bales of linters, and 80,000 tons of hulls. The average value of the annual product is about $2,750,000.

I have thus endeavored to give some of the facts connected with cotton seed oil, its history and its quantity and production, in the hope that our trade may find it a profitable product to deal in. I will now enumerate some of the uses to which it has been applied, hoping that they may suggest others even more in line with our especial interests.

The principal use to which it is put is for food purposes. The claim that it is more healthful than many animal fats has been largely responsible for its extensive adoption in this connection. Nearly seven-eighths of the 28,000,000 gallons produced per annum probably find their way into "refined lard," and salad and cooking oil. It is used for illuminating, in the manufacture of bolts and nuts; for all kinds of soap, bath, laundry, and toilet soap. It is used as a substitute for olive oil as an emulsion in medicine; it has been prescribed as a substitute for cod-liver oil, and for olive oil in packing sardines, and in many other ways. It is said that its non-drying properties debar its use as a wood filler, or for stuffing hides in making morocco and other leathers. No treatment has as yet been discovered which will give it the "drying" properties of a good menstruum for paints. As a soap for woolen mills, it has been extensively adopted in America, England and Scotland.

As an illuminant, a writer claims that its place is midway between sperm and lard oil. It can be burned alone or mixed with petroleum. On the coast of Maine there are a number of establishments shipping "sardines" and "shadines," which are said to be cooked and then placed in boxes containing cotton seed oil: and it has been charged that of the immense quantity of sardines exported from France and other European countries, largely more than three-fourths are now treated with cotton seed oil instead of olive oil, as was formerly the exclusive practice. It has been suggested that the oil could be used in candle-making and for steel tempering.

By the time of the next meeting of our Association, I trust that this abundant and interesting American product may be fully treated by some of our members in a paper from a scientific standpoint, in which many new and valuable pharmacal uses may be pointed out.

PURE METHYL ALCOHOL AND ITS USES IN PHARMACY.

BY C. P. NASH, DETROIT, MICH.

If any apology be required for this paper, I have one ready. It is the same the poor wet-nurse in the story offered when chided with having brought into the world a child without a properly-attested father—delivered, but not signed and sealed. I can at least plead, as she did, that "It is such a little one." On the other hand, I would be justified in making it big enough, for I have legitimacy on my side, and every proposition I will make to you will be based on purity; the latter fact is one I beg you to keep well in view as you listen to the few words I have to say. There are two considerations which impel me to be brief. One is the intelligence to which I appeal and which will need no long-drawn-out diagram to assist it in grasping at once the reasonableness of what I will say. The other is that when one has stated an axiom, it is time for him to stop, inasmuch as he can do nothing further than to iterate and re-iterate it, and what I have to tell you is practically axiomatic. When I speak of Methyl Alcohol and its uses in Pharmacy, please bear in mind my request concerning purity, for I refer solely to the perfectly pure spirit.

As it has been but a short time since a pure methyl alcohol has been obtainable, the subject of its uses in pharmacy naturally promotes a good many discussions, and, of course, various opinions.

Since methyl alcohol, upon combustion, yields similar products to grain alcohol, why should it not find a legitimate place in pharmacy? It is conceded by most writers on the subject that it has better antiseptic qualities than ethyl alcohol: and, assuming this to be an age of antiseptics, why will it not be worthy of careful consideration on this ground alone? I have watched with careful interest its results in external remedies, the menstruum being alternated with ethyl alcohol (the persons employing them not knowing which was being used). The reports in most cases were in favor of the remedies in which the methyl spirit was used, and not one was adverse to it.

Dujardin-Beaumetz, Andige and Picaud have demonstrated that the effect of the monatomic normal alcohol is the same in quality.

For tinctures of arnica, iodine and other external tinctures, I consider it equal to ethyl spirit.

For bay rum, it has an odor not unlike the spirit used in South America, which is made from cane.

For fortifying witch-hazel, I find it liberates the same, thereby producing a more significant and better odor.

For flavors, where the alcohol *entirely evaporates*, I would recommend methyl alcohol.

As a solvent it is certainly equal if not superior to ethyl alcohol, and at much less cost.

I would also recommend its use in the process of making powdered and solid extracts.

The Illinois Pharmaceutical Association at its meeting of 1897, (report of the committee on revision of the United States Pharmacopœia) recommended pure methyl alcohol in the processes for resins of jalap, podophyllin and scammony, and for all solid extracts: bay rum, tinctures of arnica, benzoin, benzoin compound, calendula, iodine, pyrethrum and quillaja; and in the liniments of soap, soft soap and compound mustard. We may thus conclude that the effects of pure methyl alcohol will at least correspond with those of its homologue,—if they do not excel them. Remembering still that I argue for only the *pure* methyl spirit, I think you will concede that if I have erred at all in making claims on its behalf, it has been on the side of moderation.

SOME OF THE DRUG CONDITIONS DURING THE WAR BETWEEN THE STATES, 1861–1865.

BY JOS. JACOBS.

Here, in grand old Maryland, this border state of the by-gone Confederacy, at a time when men of that war generation who fought on either side of a great and memorable conflict, meet with the sons of both in friendly conference, at a time and place where none can be stirred to animosities by recalling the subject, I present a paper relating to the drug trade and drug conditions as they appeared during the War of 1861–'65, especially as they existed in the Southern states.

Whatever may be the final verdict of mankind as to the justice of the cause for which the seceding states engaged in warfare with their kindred commonwealths, it must follow the recorded admission of the heroism and magnanimity of the Southern people in maintaining that brave struggle in arms against the proud and wealthier section of our common country; and, just as sure as that now the old soldiers of the South and their sons stand as ready to answer any call of our splendid Union of States against any and every foe, as the old soldiers of the North and their sons, just as sure are the hearts of all willing to still all sentiments in reference to the old conflict of arms, excepting such as spring from pride in the valor of those who wore the blue and those who wore the gray.

There are few American citizens, to-day, who would not rejoice if the bloody record of that war, with its story of suffering and death, had no place in our history. Would that we, as brother Americans, had never been compelled to witness any of the scenes or consequences of that sad conflict, and that our children should never have been called upon to turn the pages of its annals.

We cannot doubt the existence of genuine reconciliation now, since the calls that have so recently assembled our gallant boys from every state in our Union, and who, mingled together, have illustrated the common valor of Americans in arms against the Spanish hosts, and whose acts of heroism are now recorded in never-dying lines that shall commemorate the worth of North and South, and East and West, alike.

As pharmacists, rejoicing in the existence of a truly re united country, we should recognize that we must ever stand ready to do our part should foemen ever invade our territory, standing true and firm though we should be isolated from all the nations of the earth; and, so, looking back over the days of the war between the states, I have endeavored to see if there were not some lessons to be learned from the adversities in which the Southern people found themselves in the matters that particularly relate to our profession. For, when a people is put to straits and when overwhelming necessities confront them, invention is stimulated, experiment prompted, and, out of their very helplessness, often, intelligence is aroused and action follows which evolves new and valuable accomplishment.

The Southern people prior to the war were almost exclusively an agricultural people. The broad acres of the South yearly whitened in fleecy cotton, or waved with yellow grain, or sent forth from their soil the cane and rice harvests, or pastured the flocks within their confines. At the beginning of the war, except at Richmond and a few other of the more northerly cities, there were very few machinery plants, and the factories and foundries which produced articles of cotton or wool or brass or iron and steel, were small in number and in the extent and variety of their productiveness. The splendid water powers of the Carolinas and of Georgia that now mingle the music of their falling with the hum and whirr of textile mills, wasted over their rocks as they ran to the sea by the cotton fields in the broad, alluvial valleys. Boats that ran up the Mississippi and the Ohio were laden with the cotton and wheat of Texas and the sugar and syrup of Louisiana or the imported products of the Mexican Gulf countries, and they returned freighted with coal and iron and all the varied manufactured products of the North and East. Tennessee, Arkansas, North Carolina and Virginia were dotted with granaries and tobacco barns, and sent their "cattle" from a "thousand hills" into the markets of the country. Florida and Mississippi were largely engaged, besides in the production of the usual Southern crops, in furnishing the fruits of their orchards and the output of their fisheries to commerce. The inexhaustible beds of iron ore and manganese and coal of Georgia and Alabama and Tennessee were still unexplored, and the vast quarries of Georgia marble and granite, now yielding rich profits to Northern investments, were then overlooked and unworked.

It can be imagined that a territory like this, unprepared for war and sustaining an ignorant slave population which amounted to at least two-fifths of the whole number of persons, suddenly confronted by an armed conflict and at once invested by vigorous, watchful and competent blockading fleets, full of natural resources, deficient in organized industries, rich in the possession of men of intellect and executive capacity, would be met by a situation calling forth every talent and resource of its people.

Side by side in the columns of the newspapers, with the stirring appeals to patriotism in editorial language and poetic meter, were official orders and advertisements; and scientific and literary men vied with one another in publishing suggestions and hints and descriptions of processes that would be useful in directing the minds of the people toward solving the problems of supplying necessary munitions of war and all the articles for camp and field and hospital and household use.

To say nothing of the destruction of property and of the whole labor system of the South with its attendant losses, some idea of the extent of the effects of that war may be gathered by reciting a few facts from official data.

Eleven out of the thirty-four States seceded. The men of military age from eighteen to forty-five on the Southern side numbered 1,064,193, including lame, halt and blind, etc. On the Union side were more than four to one, or 4,559,892, not estimating monthly accessions from the world at large. In enlisted men the numbers were, for the South, 600,000; for the North, 2,865,000. The slave States of Kentucky, Missouri, Maryland, West Virginia and Tennessee, gave to the Union 300,000 men. Thus there were in the field four armies of the North, each as large as the entire Confederate forces, not including the 300,000 men contributed by the slave States.

In numbers the Federal loss was 67,058 killed and 43,012 died of wounds; of Confederates, 53,873 were killed, and 194,026 was the number of killed and wounded on the fields of battle. More than one-third of the Confederates were confided to the surgeons, besides the sick and wounded prisoners of war.

The Confederate government, immediately after the formation of a provisional government at Montgomery, were confronted by strong facts and large figures as to supplies for the different departments. Agents were sent at once to Europe, most of whom were in London, and where they established a weekly newspaper, with local correspondents in nearly every Southern town from Virginia to Texas. Instructions were given that, as there were only two sources of supply, capture and blockade running, importance was to be given to securing first, arms and ammunition; second, clothing, including boots, shoes and hats; third, drugs and chemicals, such as were most pressingly needed, as quinine, chloroform, ether, opium, morphine, rhubarb, etc. These agents were instructed to see that all blockade runners or any transport ships, barks or brigantines, that were clearing for Southern ports for cargoes of cotton or naval stores, were loaded with the above enumerated articles; the cargoes to be consigned to individuals, firms or agents of the government at any port to which they cleared.

At the outset of the struggle the question of drugs and medicines was thus third in importance, and the druggists of the South had either to manufacture what they could from native barks and leaves and herbs and roots, or purchase at Southern ports such supplies as the blockake runners brought in that were not intended for the government. In most cases these cargoes were offered at auction. This was a custom at Galveston, New Orleans, Mobile, Charleston, Pensacola, Savannah and Wilmington. The gulf cities received large supplies from Cuba; while in Texas there was almost a continuous train of contrabanders, or smugglers, bringing goods across the Rio Grande from Mexico, but not much of this was medicine.

As to capture, while the army frequently captured the wagon trains of the enemy, thus obtaining some supplies of medicines and surgical appliances, these were barely sufficient to supply the most distressing needs in the army; so, it may be seen that home manufacture and blockade running were the only source of supply during nearly four years for between six and seven millions of people.

The interior towns suffered most; such places as Jackson, Meridian, Columbus and Aberdeen, in Mississippi; Selma, Montgomery, Eufaula, Huntsville, in Alabama; Albany, Columbus, Macon, Augusta, Athens, Rome and Atlanta, in Georgia; Spartanburg, Greenville and Columbia, in South Carolina; Fayetteville, Goldsboro, Raleigh, Statesville and Charlotte, in North Carolina; and Danville, Lynchburg, Petersburg and Richmond, in Virginia. In nearly all of these towns one or more druggists manufactured from stock on hand of roots, herbs and barks, or from home supply of such medical plants as he could secure, tinctures and like preparations.

The supply of whisky was not so short as that of medicines. The so-called "moonshiners" of the mountains of North Carolina, Tennessee, Alabama and Georgia kept their stills (often made of gum logs) running night and day, and could find a ready sale for all they produced. So far as I can learn, no tax was placed on whisky. In New Orleans rum was made from molasses, one distillery turning out over one hundred barrels of this product every day for over a year.

Amongst the scarcest articles in a drug store in those days were paper, twine and corks. Some of the stores obtained old life preservers from abandoned river boats and got a supply, thus, of hand-cut stoppers. Various fabrics were pressed together for small stoppers, and for large bottles, demijohns and jugs, different sized corn-cobs commanded the same price as XXX corks do to-day. In the museums of New York, Washington and Chicago can be seen some of the specimens of attempts to manufacture glass bottles in Louisiana, Alabama and South Carolina.

In the interior districts and small villages the country doctors returned to first principles and to the use of the plants of the fields and forests; and these agencies were about all they had to rely on, outside of whisky and a little quinine, the latter frequently at $100 an ounce.

Interviewing one of our old Confederate surgeons, he said: "During the early part of the war I was placed in charge of a railroad hospital in a small town where it was difficult to obtain medicine at almost any cost, and as I had my little hospital crowded nearly all the time, both with employes of the road and wounded and sick soldiers, afflicted with various diseases and all kinds of wounds and injuries, and being also engaged in general practice, it naturally followed that my mind was severely taxed in order to supply remedies and substitutes to meet the demands of such varied practice. I perused my dispensary and called into requisition an old botanic practice that had been handed down as a relic of the past, but from which I confess to have received valuable aid and very many useful hints in regard to the medical virtues of our native plants. I give you the following facts from a record I kept of the patients treated, and the remedies I used, and the principal substances I resorted to.

"Of that large class of medicines, so useful in surgery and so much in demand in war times, called antiseptics, most of them, I may say, have been discovered and appropriated to surgical use since our war. In fact, I had but little else at my command except the cold-water dressing for wounds. From experiment I learned to improve on the plain old method, as I think, by employing a decoction of red-oak bark added to the water, which acted as a disinfectant, and by its stimulating and astringent properties promoted the healing process. I also used a weak solution of bicarbonate of soda, which I found beneficial in the suppurative stages. When emollients were indicated, I used slippery elm and wahoo root bark, and solution of common salt often helped. In case of great pain I employed poppy heads, nightshade and stramonium.

"I had a number of cases of intermittent fever. I would give strong boneset tea, warm, until free vomiting was produced, and as a substitute for quinine I used, during the intermissions, butterfly root or pleurisy root tea, which would nearly always cut short the febrile stage.

Remittent or bilious fevers were treated much the same way, except that I invariably gave good doses of mandrake tea in the beginning. White ash root or prickly ash root were often given in these fevers to advantage, using always the butterfly-root tea in the febrile stage. Virginia snakeroot, yellow root, or Sampson's snake-root acted nearly as well, but I preferred the other. If I could have obtained blue mass or calomel I would have begun treatment with a dose or two of that, but none were to be had.

Mayapple root or peach-tree leaves made into a strong tea and drank warm would act on the bowels as certainly as senna; but with children, where too much tea is not desirable, I often gave beef's feet oil, hog's feet oil, or even lard heated with syrup.

In cases of pneumonia, pleurisy, catarrhal fevers, etc., I made local applications of mustard seed or leaves, stramonium leaves, hickory leaves, pepper, etc., warm, and gave alternately butterfly-root and sanguinaria, and continued to slightly nauseating, from day to day (no need of anything else). The two last-named remedies took the place of Dover's powder, quinine and all other diaphoretics, febrifuges and arterial sedatives.

Phytolacca or poke was another favorite remedy—the tincture, when alcohol or whisky could be obtained; otherwise, tea of root or berries. I used it in all cases of chronic rheumatism or neuralgia, enlarged glands, scrofula, syphilis, and all cases requiring alteratives, often combined with American sarsaparilla root, sassafras, alder and prickly ash.

Female complaints gave me some trouble, but I soon learned the use of black haw, squaw-weed, partridge berry, etc. I had been taught in the old text-books that opiates in large doses would control some cases of threatened abortion, when the patient had not lost too much from hemorrhage. I found that the black haw root tea would absolutely stop this tendency, not only in cases where there was but little hemorrhage, but where large quantities had passed, and would relieve the most severe case of dysmenorrhœa, especially when combined with squaw-weed, partridge berry or red shank.

In stomach and bowel diseases I found but little difficulty in obtaining plenty of substitutes for opiates, astringents and the like; in fact, I believe that an all-wise Providence has especially provided the best antidotes in creation on the hills and dales, and by the vales and streams of our own Southland. In ordinary looseness of bowels or diarrhœa I gave an infusion of raspberry leaves or whortleberry leaves (both of which act finely on the kidneys and bladder). Where there was nausea or sick stomach, a handful of peach-tree leaves steeped in water and drank will settle it, or what is perhaps better, the kernels of two or three seeds cracked and cold water drank off of them. If stronger astringent is necessary, the inner bark of red oak, blackberry or dewberry root tea, or red shank root, are sure remedies.

Agrimony tea, and, as a last resort, the nut-gall or ink-ball made into what, from its color, I called black wash (made by squeezing the juice out and adding a little copperas). This black wash is not only a splendid ink, but is a destroyer of syphilitic sores, warts, corns, ringworm, and old ulcers and excrescences of nearly every kind, much superior to lime water and calomel. Weakened properly, it is good in obstinate bowel diseases, and can be used as an injection in gonorrhea, gleet, etc. Silk weed root put in whiskey and drank, giving at the same time pills of rosin from the pine tree, with very small pieces of blue vitriol, will cure obstinate cases of gonorrhea, and is a substitute for copaiba, cubebs, etc.

"I raised lobelia from the seed, and found it to be a reliable emetic, useful in cough medicines, croup and asthma. I have relieved asthma with lobelia and by smoking stramonium leaves. We, of course, used turpentine as an adjunct in all cases where indicated, which is the case in very many diseases, and in many a positive curative agent.

"Onions and garlic were useful as poultices in nearly all glandular enlargements, as are also poke-root, celery, pepper, parsley, sage, thyme, rue and other garden products. Many of the latter were used for diseases of women and children.

"White sumac, red elm, prickly ash, and poke, will in connection with my black wash cure recent cases of syphilis. It will also cure many cases of chronic rheumatism. Peach-tree leaves and Sampson's snake-root will cure most cases of incipient dyspepsia. Gargle made of sage and honey will cure most cases of sore throat, tonsillitis, etc.

"For infants, calamus, catnip and soot teas are better than soothing syrup with opiates." . . .

Nearly every old practitioner in the South, to-day, is full of such reminiscences as the foregoing.

Notwithstanding the restrictions on inter-state commerce and the almost exclusive reliance on blockade runners for supplies, many druggists in these southern towns and cities displayed much ingenuity in the disposition of the stocks bought at auction at the seaports.

Mr. H. Metcalf, of Montgomery, relates that he attended an auction sale at Mobile on one occasion, and, arriving late, found the cargo all sold except cod-liver oil and beeswax, which he succeeded in purchasing. His two barrels of cod-liver oil and 600 lbs. of beeswax were immediately reshipped to Montgomery on the Alabama river. Filling every shape and size bottle to be found, and placing a judicious advertisement in the papers, he was enabled to sell the oil, but what to do with the beeswax was a puzzler. Discovering a set of candle-moulds and using cotton yarn as a wick, he ran the entire mass into candles and succeeded in selling the whole stock at 10 cents apiece.

Nashville fell early in the action, and there was but little suffering there on account of failure to obtain medical supplies. One incident is related there showing the shrewdness of druggists at Nashville. When it became known that all the manufacturing enterprises would be blown up on the evacuation of the town, a shrewd druggist went around and succeeded in buying all the window glass in town. Three days later the explosions, on the retreat of the Confederates, broke one-half the window glass in the city, and Mr. S. reaped a rich harvest from his corner in window glass.

Various small attempts were made to manufacture chemicals at Knoxville, Tenn., Greenville, S. C., Columbia, S. C., and Milledgeville and Macon, Ga., but, outside of producing a few gun-caps and nitre for making gunpowder and a few carboys of sulphuric acid for charging the torpedoes in Charleston harbor, very little was accomplished. Later on some small manufacturing was done at Richmond and Charlotte, but, owing to the want of machinery and proper apparatus, little was achieved. A blockade runner brought into Wilmington, N. C., a supply of apparatus for making sulphuric acid, which arrived only a few days before the city fell. Much might have been accomplished with this but for the fall of Wilmington, as the plant was said to be first-class, and, it is said, was disposed of for a large sum to a Philadelphia manufacturer.

The excessive high price of quinine made its handling a profitable employment. Almost every means known to human ingenuity was employed to smuggle it through the lines. Small packages were placed in letters, which the Adams Express Company would guarantee for the sum of $2.00 to deliver to the post-office authorities at some point in the Confederacy. Officers speculated in it, buying and selling until this created a scandal almost equal to that of speculating in cotton, and it was finally stopped by a strong proclamation.

A large contraband trade was carried on by an almost continuous line of house-boats floating on the Mississippi river. When opposite Memphis the goods were either sent in at night or into the interior of Arkansas, where trusty parties soon disposed of the stock. The great bulk of this trade was sent out by traders and speculators in Paducah, Ky., and Cairo, Ill., and their main points of operation were Memphis, Tenn., Helena, Ark., Napoleon, Ark., and Greenville, Miss. In regard to Napoleon, very few of this generation ever heard of the town, nor can it be found on the maps of the present day; yet in war time Napoleon, Arkansas, was a town of nearly 3,000 people, well built with brick business houses, and contained a large U. S. marine hospital, built of brick; and situated as it was on the Mississippi, at the mouth of the Arkansas river, it was at one time a rival of Memphis for trade. This village was entirely destroyed by flood in 1869 or 1870; the last vestige of the large marine hospital was carried into the Mississippi river in 1874, and to-day there is not a human habitation left to show where Napoleon once flourished.

One of my Alabama lawyer friends, an ex-confederate famous for learning, for valor as a soldier and for delightful humor as a raconteur, once related to me the following reminiscences:

To supply the trying necessities of the drug demand, he said he had heard of many amusing plans that were resorted to by the government itself, and by persons who were mainly prompted by neither impulses of humanity nor patriotism, but by the simple desire of gain. He said he heard of a woman who went into the Northern lines four times, returning always with a considerable quantity of the more costly drugs concealed beneath her skirts. On her return from the fifth trip, however, some portion of her paraphernalia, while on a ferry boat, was caught in a way to put too great a strain on some string or buckle, so that it gave way, and the walking drug-store was brought down to "dire combustion."

A Mr. Berg, a merchant of Middle Alabama, says my Alabama friend, at the beginning of the war found himself with empty shelves and counters and no market from which to replenish his stock. He had had some experience in the sale of drugs and medicines, so he determined to occupy his genius, being too old to go to the war, by carrying on a contraband trade in this profitable direction. He started on a dangerous enterprise, as the South had interdicted trade in cotton and the North had placed the ban on drugs — especially on stimulating liquors. Mr. Berg selected Memphis as the base of his operations, and proceeded up to the northern part of Mississippi, a country alternately in the hands of the Confederates and the Federals. Here he purchased a common road wagon and four mules, and loaded the wagon with cotton. In a few days he arrived, with an assistant, within the Federal lines at Memphis, where he disposed of his cotton at war figures, for United States money. His wagoner, having received his reward, deserted, and Berg could find no one to go back with him to the South. He was about to abandon his enterprise of investing in drugs and medicines for lack of proper means of transportation, when he accidentally, while looking after his own team and wagon, discovered a two-horse vehicle, considerably battered and disfigured, but surmounted by a white cloth covering, over which was a small yellow hospital flag, and upon the sides of which was painted in large letters "Small-Pox." In a short time Berg had exchanged his four-horse vehicle for the smaller one, and selecting two of his best mules, hit upon the idea of transposing his hospital wagon into a blockade runner. He soon had a stock of quinine, morphine, ether and such other drugs as promised the greatest profit, stored away in a box under the yellow flag, and over these he placed several layers of the leather fronts for making cotton and wool cards, over these some cheap clothing, and as a last layer scattered promiscuously a collection of such articles as are usually carried in a peddler's pack, including cambric needles. The enterprise might have been entirely successful had not Berg determined to add to his stock an eight-gallon keg of good rye whisky, then exceedingly scarce in his native region.

Berg proceeded on his return journey very slowly. The roads were bad, his team weak, and he inexperienced. The yellow flag above his wagon and the legend on its sides accomplished fully all he had expected from them, so far as keeping him unmolested and preventing his contraband cargo from being detected. They were equal to the ancient cry, "Make way for the leper."

Berg himself also grew quite travel-stained, and to ordinary observation had but recently recovered from the small-pox. The end of the fourth day found his stock of provisions, both for man and beast, entirely exhausted, while every attempt on his part to approach a farm-house in order to obtain these necessities was met with threats and the barking of dogs, and he and his team went into a supperless camp. The next morning he concealed himself some distance from the highway, tied his mules out in a swamp to graze, and, having scrubbed himself up in a neighboring stream, started out afoot in hope of finding some farm-house remote from the highway where he might negotiate for provisions. Before starting, however, in order to fortify himself against the fatigue of the journey, Berg for the first time uncovered his hidden keg and drew off a bottle of its costly contents, drinking some of it before starting. An hour's wandering brought him at last to a farm which gave promise of creature comfort and refreshment. There was a woman in possession of the house as Berg approached, who forbade his coming any nearer than the gate, firmly and positively denying all his entreaties to save him from starvation. At last, however, she told Berg, who had so far forced his way into her presence that she detected the smell of whisky, that if he would furnish her a bottle of that article she would, in exchange, give him food for himself and his mules; and, as this was the only alternative, the bargain was made and she went to work preparing the provisions, while Berg returned to the wagon with the bottle she furnished. Berg had just finished his chicken and onions and bread, and the mules disposed of their fodder, and everything was in readiness for the journey to be renewed, when, with shouts and clattering hoofs, four blue-coated troopers rode up. In some way they had gotten hold of the whisky from the woman and learned from her the source of supply, and had tracked Berg to his camp. They had drank enough of the whisky to render them utterly indifferent to death or contagion in any form, and, while Berg was swearing he had no whisky, they were prying into the wagon and were emptying the keg through its bung hole into their tin-cups as freely as if it were branch water; and then they began to torment poor Berg with all manner of pranks and tricks. Finally, one of them determined to make him swallow a paper of the cambric needles, and had actually placed them on his tongue, handing him a cup of his own whisky and threatening to cut him down with their swords unless he swallowed the needles with a draught of the whisky.

Berg said that at that moment he lost consciousness, and did not even know whether he swallowed the needles or not; that when he awoke a man was bending over him asking what was the matter with him. The shouts of the drunken soldiers had attracted the attention of a party of Confederates, who, coming up unawares, had killed two of Berg's tormentors and wounded one severely, allowing only one to escape.

In such conditions as these, it is not to be wondered at that every kind of make-shift and substitution had to be resorted to in the field, in the drug store, and upon the farms and in the household.

Many times the Confederate soldier marched and camped and fought on half rations. The full ration was meagre enough. As prescribed, it was as follows: ¾ lb. of pork or bacon, or 1¼ lbs. fresh beef; 18 oz. bread or flour, or 1¼ lbs. corn meal. On campaigns or marches or on transports the ration of hard bread was one pound.

The following will give an idea of the economy that was enjoined in the matter of supplying general and post hospitals, the amounts stated being quantities for one year for one thousand troops: Acetic acid, 5 lbs.; arsenic, 5 ozs.; muriatic acid, 8 lbs.; sulphuric acid, 8 lbs.; tartaric acid, 16 lbs.; sulphuric ether, 16 lbs.; alcohol, 192 pint bottles; ammonia, 5 lbs.; nitrate of silver, 8 ozs.; assafœtida, 32 ozs.; camphor, 16 lbs.; catechu, 5 lbs.; ceræ albæ, 16 lbs.; chloroform, 8 lbs.; copaiba, 40 lbs.; creosote, 16 ozs.; adhesive plaster, 40 yds.; extract belladonna, 16 ozs.; flùidi buchu, 8 lbs.; columbæ, 8 lbs.; gentian, 8 lbs.: glycyrrhiza, 48 lbs.; hyoscyani, 16 ozs.; rhei, 8 lbs.; sarsaparilla, 16 lbs.; senna, 8 lbs.; valerian, 64 ozs.; mercuric chloride, 5 ozs.; iodine, 16 ozs.; ammonia, 32 lbs.; magnesia, 5 lbs.; sulphate morphia, 16 drs.; myrrh, 5 lbs.; opium, 5 lbs.; ether, 5 lbs.; jalap, 32 ozs.; cantharides, 16 ozs.; aloes, 32 ozs.; sulphate quinine, 80 to 160 ozs.; sugar, 160 lbs.; strychnia, 8 drs.; digitalis, 32 ozs.; unguenti hydrarg., 8 lbs.

The same sparse quantities were applicable in hospital stores' regulations and in the matter of surgical instruments, books, bedding, furniture, dressings, etc., and on the blanks furnished was printed the following: "It is urged that medical officers make requisition for such medicines only in the following table as are deemed *indispensable*."

Dr. J. Julian Chisholm, professor of surgery in the medical college of South Carolina, published in 1861 his "Manual of Military Surgery for the Use of the Surgeons in the Confederate Army." This book was widely used, and was a most valuable contribution to war surgery, containing, as it does, a most exhaustive collection of hints and instructions relative to the treatment of sick or wounded men in camp, on the field of battle and in the hospital. In his preface he says (in part), as follows: "As our entire army is made up of volunteers from every walk of life, so we find the surgical staff of the army composed of physicians without surgical experience. Most of those who compose the staff were general practitioners, whose country circuit gave them but little surgery and seldom presented a gun-shot wound. Moreover, as our country had been enjoying an uninterrupted state of peace, the collecting of large bodies of men and retaining them in health, or the hygiene of armies, had been a study without an object and therefore of little interest."

From my friend, J. F. B. Lillard, of New York, I learn the following names of some druggists who were in business at the South during those trying times: Benjamin Ward, of Mobile; H. Metcalf, at Montgomery, Ala.: J. A. Lee, New Iberia, La.; N. O. Mior, Columbia, S. C.; Jno. Ingalls, Macon, Ga.; J. J. Shott, Galveston, Tex.; F. S. Duffy, Newbern, S. C.; G. W. Aymer, Charleston, S. C.; S. T. Dernoville and A. H. Roscoe, Nashville, Tenn.; Robert Carter, Columbus, Ga.; A. Solomons, Savannah, Ga.; Crawford W. Long, Athens, Ga.

To afford an idea of the prices ruling in Richmond, June, 1863, I append the articles in some original invoices purchased by R. W. Powers from Kent, Paine & Co. Some are as follows: 3 boxes ext. logwood, 47 lbs. at $4.00 per lb.; 1 keg bicarb. soda, 112 lbs. at $2.75: 1 case brown Windsor soap, $12.75 doz.; 1 bbl. camphor, 86 lbs., at $20.00; 112 lbs. of blue galls at $4.00; 100 lbs. tartaric acid, $2.25 per lb.; salt, 44 cts. lb.; hops, $2.50 lb.; 1 cask French brandy, $52.00 gal.; Indian ink, 75 cts. bottle; 9 doz. assorted pencils, $4.00 doz.; phosphorus, $14.00 lb.; citric acid, $4.50; oil peppermint, $16.50; Epsom salts, $3.87½; 6 bottles capsules, $6.50; 12 pewter syringes, $1.25 each; 2 box blue pills, $6.00; 1 bottle syr. ipecac, $10.00; 15 ozs. quinine, $22.25 oz.; 60 dr. morphine, $28.00 dr.; blacking, $1.40 per box; tallow candles, $2.37 lb.

H. B. Metcalf, of Montgomery, wrote me in February last in part as follows:

"I find that all my old books and papers were destroyed in the fire of last July. We were able to secure some drugs and chemicals during the war by attending the blockade sales at Charleston and Mobile. We did not have to substitute to a great extent in putting up prescriptions—those of us who were fortunate enough to be supplied at the sales. We found great difficulty in securing vials and corks, and were compelled to use second-hand vials, and corks made from the tupelo tree answered very well. Prices were, of course, high; for instance, during the last year of the war all tinctures were sold at $1.00 an oz.; quinine, $25.00 per oz.; morphine, $10.00 per dr.; quinine pills, $1.00 each, and other pills $5.00 a dozen. Prescriptions ranged usually from $5.00 to $15.00. Whisky sold at $150.00 a bottle. You must recollect that greenbacks were worth about twenty times our money, gold 100 times. I imported a great many goods through Evans' Sons, Liverpool, and regret exceedingly I now have none of the invoices."

It was quite an industry, I am told by an Atlanta lady, Mrs. Marcus A. Bell, for the country people to raise castor oil beans. The crushed beans were boiled and the oil skimmed off. She said that the grandmothers of those days revived the traditions of Colonial times. They made their own dyes and coloring matters from the roots and barks of native woods. Dogwood, sumac and the roots of pine trees were largely used, and indigo was cultivated in the gardens. Instead of paregoric, fennel-seed tea was given to the babies. For rash they used red-oak bark and alum. Goose grease and sorghum, or honey, was a standard remedy for croup, backed up with turpentine and brown sugar. Sassafras tea was given in the spring and fall as a blood medicine. Adults' colds were doctored with horsemint tea and tea from the roots of broom sedge. For irruptions and impure blood, spice-wood tea was given. Wine was made from the berries of the elder bush. For diarrhœa, roots of blackberry and blackberry cordial; and so, also, was a tea made from the leaves of the rose geranium. Mutton suet, sweet gum and the buds of the balm of Gilead was a standard salve for all cuts and sores. Balsam cucumber was widely used as a tonic, and was considered a specific remedy in burns. Catnip, elecampane, and comfrey root and pennyroyal were in every good housewife's pantry, in which, also, was the indispensable string of red peppers, a bag of sage leaves and of "balm." Calamus root for colic in babies was a common dose. The best known standard Georgia tonic was dogwood, poplar and wild-cherry barks, equal proportions, chipped fine and put in whisky and taken wineglassful at meal times; it is still used in large quantities from "Yamacraw to Nickajack." In hemorrhages, black haw root was commonly used. All the white mustard we had was raised in our gardens.

She learned from these experiences that barks were best gathered while the sap was running, and when gathered the outer and rougher portion should be shaved off and the bark cut thinly and placed in a good position in the shade to dry; that roots ought to be gathered after the leaves are dead in the fall, or better, before the sap rises; that seeds and flowers must be gathered only when fully ripe, and put in a nice dry place, and that medicinal plants to be secured in the greatest perfection should be obtained when in bloom and carefully dried in the shade.

I here append a list of substitutes that were used by druggists and physicians during the war in large quantities, in most of the instances being the only medicines of the kind to be had :

IMPORTED ARTICLE.	SUBSTITUTE.
Columbo, Quassia	Yellow root.
Spanish Flies	Potato bugs.
	Powdered leaves of butternut.
Jalap	Wild jalap.
	Wild potato vine.
	Fever root.
Aloes	Wild jalap.
	Mulberry bark.
	Butternut.
	Dock.
	Wild potato vine.
	Amer. colombo.
Quinine and Peruvian Bark	Tulip tree bark.
	Dogwood.
	Cotton-seed tea.
	Chestnut root and bark.
	Chinquepin root and bark.
	Thoroughwort.
	Spanish oak bark.
	Knob grass.
	Willow bark.
Digitalis	Blood-root.
	Wild cherry.
	Pipsissiwa.
	Bugle weed.
	Jasmine.
Conium	American hemlock.
Opium	American hemlock.
	Mother-wort.
Sarsaparilla	Wild sarsaparilla.
	Soapwort.
	Yellow parilla.
	China briar.
	Queen's delight.
Chamomile	Dogwood.
Flaxseed	Watermelon seed.
Gum Arabic	Low mallows.
	Apple, pear and quince gum.
	Balm.
	Watermelon seed.
Ergot	Cotton-root.
Guaiacum	Boxwood.
	Poke.
	Prickly ash.
Ipecac	Wild jalap.
	Carolina hipps.
Mezereon	Prickly ash.

Kino and Catechu	Cranesbill.
Senna	Wild senna.
Colocynth	Alum-root.
Tannin	Smooth sumac.
Olive oil	Peanut oil.
	Beech-nuts oil.
	Cotton-seed oil.
Laudanum	Hops.
	Mother-wort.
Acacia	Slippery elm bark.
	Sassafras pith.
Bougies	Slippery elm bark.
Corks	Black gum roots.
	Tupelo wood.
	Corn-cobs.
Allspice	Spice-bush.
Pink root	Cardinal flower.
Assafœtida	Wild chamomile.
Calomel	Dandelion.
	Pleurisy root.
	Butterfly weed.
Belladonna and Hyoscyamus	Jamestown weed.
Valerian	Lady's slipper.
Colchicum	Indian poke.

From various physicians, intelligent ladies, and from old Confederate magazines and books and newspapers, I have gathered the following data in reference to peculiar and unusual uses of articles that are incident to our trade, that seemed to be of more or less general employment in the South by physicians, druggists and in Confederate households.

Wood anemone was employed as a vesicatory in removing corns from the feet. Powdered may-apple mixed with resin was used as a caustic in treating horses, the farriers using it for escharotic purposes. On the farms the juice of the pulp of the maypop seeds was made into a summer drink in place of lemonade. Powdered blood-root, snuffed up the nose, made a powerful sternutatory and was applied as an escharotic to fungous flesh. Pond-lily poultice was extensively applied to ulcers. Button snakeroot, or globe flower, was used largely as an expectorant and diuretic. Toothache bark (aralia spinosa) was used to allay pain caused by carious teeth, and in South Carolina the negroes relied on it almost exclusively for rattlesnake bite. Side-saddle or flycatcher was used in the various forms of dyspepsia. Ink was made from the rind of the pomegranate fruit and from poke berries. Where during convalescence an astringent tonic was indicated, dogwood supplied the need. This, with the blackberry and gentians and pipsissiwa as tonics and diuretics, and sweet gum, and sassafras for mucilaginous and aromatic properties, and wild jalap as a cathartic, supplied the surgeon in camp with easily procurable medicinal plants, which proved sufficient in many times of need.

I here relate another reminiscence of my Alabama soldier friend, Col. Sumter Lea, of Birmingham, using his own language as near as I may be able to repeat it:

"I never heard of but one physician who was promoted on the field. The army once encamped at Tullahoma, Tenn., and obtained their water from a small stream which flowed as well as it could through a dense wood, where the leaves were as thick as in the "vale of Vallambrosa." The eddying pools were crystal, bright and clear, but disease and death lurked in their beautiful eddies, for bowel diseases were produced, unusually, among officers and men, and, in the absence of any pharmaceutical attachment to the army, it was without remedy until Dr. Cowan, attached as an assistant physician to a Tennessee regiment, adopted the use of what is now the famous "tablespoon remedy," consisting of a tablespoon of Epsom salts, and equal quantities of bicarbonate soda and laudanum, this dissolved in water and taken a tablespoonful at a dose. This remedy acted magically, and being so widely adopted, attracted the notice of General Forrest, who, out of admiration and gratitude, promoted Dr. Cowan to his personal staff, with rank of major. There was another doctor who ought to have been promoted for this same sort of service, for diseases of the bowels, during long encampments, became pestilential. The food, especially the bread, when prepared by the ordinary mess soldier, seemed to be especially invented for the production of irritation. Such camp-made biscuit would these days prove a successful rival and threaten the 'rubber trust.'

"An Alabama surgeon named Langhorne, with his hospital assistant, a good-natured fellow called 'Sonk,' grieving over these miseries, determined to find a remedy in his total lack of drugs for these multiplied woes, characterized under the synonyms 'diree' and 'diseremus.' After drawing largely on all their genius, they invented a pill composed of equal parts of red pepper and crude rosin, the latter of which they gathered from the near-by trees, and which they consigned to immortality under the name of the 'Diseremus Pill.' It was amusing, despite the sadness of the scene, to watch the doctor and his assistant, each with their cup full of their invention, going out to meet the weak and melancholy throng, who, in answer to the surgeon's call, emerged from their tents, morning after morning, and in single file marched wearily and languidly along, each in turn receiving in his feverish palm a dozen or more of 'Diseremus Pills,' with the laconic instruction to 'take two after each loose operation;' and even these instructions, when the tongue of the doctor grew weary with their constant repetition, was shortened into a sort of ejaculation as the pills were dropped, 'two after each loose,' until this grew into a sort of by-word about the camp."

The bark of the dogwood and swamp willow was mixed with tobacco for smoking. Watermelon juice was made into a syrup, and the rind into preserves. The seed of the watermelon and those of the gourd were used as a diuretic. Gourd rind was used as mould for buttons. The ladies of St. John's Parish, S. C., used prickly pear for hardening tallow in candle making, one pound to four pounds of tallow taking the place of wax. The hand-leaved violet formed an emollient application. Red maple made an astringent wash.

In the process of dyeing it was found that maple andsweet gum barks with copperas made purple; maple, red oak and copperas, dove color; maple and walnut, brown; sweet gum and copperas, nearly black; peach-tree leaves and alum gave yellow; the artichoke and black oak bark also gave yellow; sassafras root with copperas, a drab; smooth sumac, root and bark and berries, gave black; black-oak bark with a basis of alum gave a bright yellow; with oxide of tin, tints from pale yellow to bright orange; with oxide of iron, a drab; black-oak galls in a solution of vitriol made purple, which, as it grows stronger, passed into a black; alum and alder, yellow; hickory bark and copperas, olive; hickory bark and alum, green; white-oak and alum, brown; walnut root and leaves, alone, black; blacksmith's dust was frequently used in place of copperas.

Buckeye lotion was used for gangrenous ulcers, and by some for the toothache.

Among the substitutes for coffee, at home and in camp, the following were a part: Rye, parched okra seeds, cotton seeds, parched sweet potatoes, parched corn hominy, peanuts. It was stated in printed articles "that half the coffee sold in New York and Boston the past twenty-five years has been composed chiefly of rye."

Cotton-seed decoction was used for inflammation in mucous passages. The roots of the cotton plant were employed in asthma, and by the negroes as an abortant. Soap was made from cotton seed by treating them direct with lye.

Among the substitutes for tea were Ceanothus Americanus, known as red root, or New Jersey tea, and holly leaves and blackberry and raspberry leaves and rose leaves.

The Amelia azedarach (China berry) furnished some valuable uses. The berries were employed in making whisky; the bark of the root used as an anthelmintic. The leaves were said to prevent "botts" in horses, and were used to pack with dried fruits to preserve them from ravages of insects. A soap was made from the berries, called "Poor Man's Soap."

The ox-eyed daisy was used in place of Persian insect powder—an insecticide used as far back as 1857. In the country, fresh elderberry leaves were laid near the head of a bed-ridden person to keep away flies.

In the households and on the farms many interesting expedients were resorted to. The newspapers were full of directions about soap-making and for preparing and obtaining the materials. The Richmond *Dispatch* and Wilmington *Journal* published minute directions for making soda from sea weed and corn-cobs, and recipes for making soaps.

Blackberry wine was used almost exclusively as a substitute for foreign wines, and some wine was also made from wild grapes and the berries of the elder bush. All the newspapers published recipes for making these wines, and there is scarcely a housewife in the South who does not know how to make them to perfection.

In the Mobile *Register* I find the following: "To alleviate the suffering and perhaps save the lives of many of our soldiers, when sickness may be traced to the use of unwholesome water in limestone regions, blackberry cordial is recommended. The following is a good receipt: Bruise the berries and strain through a bag; to each quart of juice add half a pound of loaf sugar, a heaped teaspoonful of powdered cinnamon, the same of cloves, and a grated nutmeg; boil these twenty minutes, skimming well. When cool, add half pint of brandy for each quart, or add good whisky."

Compound syrup of blackberries was recommended and used as a vehicle for medicines. It was made by adding a half ounc each of cinnamon, allspice, nutmeg, cloves, to half a gallon blackberries. These were boiled twenty minutes in a kettle and strained through a piece of flannel. To this was added loaf sugar to make very sweet, and half pint of cognac brandy to two quarts.

A decoction of the blackberry root and the rind of the pomegranate fruit boiled in milk was a common remedy in diarrhœa.

The roots and leaves of the cockleburr were considered serviceable in passive hemorrhages, diarrhœa, gonorrhœa, and as a deobstruent in obstructions of the spleen and diseases arising from torpid liver.

One or two ounces of a decoction of Indian physic root (Gillonia trifoliata) was given as one emetic, the dose of the powdered root being thirty grains, persisted in until vomiting occurred.

The liquor called *piquette* was largely substituted for cider, wine and beer. It was considered to serve as a tonic, and tended to quench thirst. Directions for making it were as follows: Water was filtered through the pressed and fermented mash of grapes. The mashed grapes were put into a cask, pressed very full, and afterwards hermetically sealed and put in a cool place. When to be used, the head was taken out of the cask, water was added until the whole mass was moistened and water stood on the top. Thus, at the end of the fourth or fifth day the liquor could be drawn off for daily use, the place of the portion used being furnished by a new supply of water. In this way a cask of thirty-six gallons furnished about four gallons of piquette for about twenty days. Piquette was also made from pears, cherries, plums, figs and juniper berries. The rhinds of oranges, lemons and aromatic plants, angelica roots, peach leaves, etc., were often added when the drink was too sweet.

Engravers found that the different woods were of hardness as follows: First, the wild currant or service tree and the apple and pear; next, the dogwood, redberry (azalea nudiflora), and kalmia latifolia; then the holly, when well dried; but of all, the boxwood was preferred.

The peach tree furnished a number of uses: The gum was used instead of gum arabic; a tea of the leaves given in whooping cough; the leaves used to season creams instead of vanilla; the leaves used in dyeing.

Beer was made from maize, the persimmon and the sweet locust.

Calycanthus (sweet shrub) was employed as an antispasmodic tonic in case of chronic agues, a strong decoction of the bark of the root or of the seed being given. It was noticed that the root was strongly camphorated.

As an antidote for poison oak the bruised leaves of the Collinsonia canadensis (stone root) were employed; as also the Verbena urticifolia.

Rhus glabra (smooth sumac) was used as a gargle for cleansing the mouth in putrid fevers; and a decoction of the root employed in gonorrhœa and gleet. A vinegar was made from the berries.

Beech-tree leaves, collected in the autumn in dry weather, were used for filling beds, the odor being grateful and they being very elastic.

Black oak was considered efficacious in leucorrhœa, amenorrhœa, chronic hysteria, diarrhœa, rheumatism, cynanche tonsillaris and asthma. The powder of the bark, mixed with lard, was a remedy in painful hemorrhoids, and used as a fomentation in prolapsus uteri and ani, and for deflections in these parts.

I quote from an article of Dr. Daniel Lee, in the *Southern Field and Fireside* of 1860: "It is poor economy for the South to destroy all its valuable tan-bark in clearing oak land, cutting rail timber and firewood, and thereby deprive our descendants of the power to manufacture their own leather. To send a million dollars worth of hides to the North, have them tanned into leather, made into shoes, boots, saddles and harness for Southern consumption, is to pay about eight million dollars for the support of that Northern economy which never wastes the bark that grows on oak and hemlock trees, and that industry which turns this bark into gold." Such advice as the following was published: "Every farmer ought to save all the tan-bark that he can, for we speak advisedly when we say that the Confederate States are even now short of oak bark if they are to manufacture all the leather they are to consume in saddles, bridles, harness, saddle bags, buggy and carriage harness, caps and hat linings, book bindings, boots and shoes. Since the mechanical trades are essential to our happiness, we should encourage our sons to become scientific mechanics as well as farmers, lawyers, doctors, priests and soldiers."

As substitutes for hemp the following were used: The sunflower stalk, *Asclepias syriaca*, *Urtica diœcia* and *Yucca filamentosa*, or bear grass. The juice of the skin of the blue fig made a red ink. Fig twigs were used as pipe stems. Rope was made of wahoo (*Ulmus alata*), and used in baling cotton. Wax myrtle (*Myrica cerifera*) was employed in making candles, and as a basis for fine soap. The soap was obtained from the berries by boiling and skimming. Four pounds of the wax made forty pounds of the soap, with the other ingredients counted. Candles made by the addition of grease are of a green color. Says the Charleston *Courier* of 1861: "We have been so long dependent on our Yankee enemies for soap and candles that we have forgotten that we can make them ourselves. To our shame, we admit that even on our plantations in the low country and seaboard there are abundant materials for making the best candles in the world, but millions of pounds have been permitted annually to decay unused. The low bush myrtle, indigenous to our coast from Virginia, *ad libitum*, south, the berries of which are now mature, will afford a supply of wax that, with the addition of one-third tallow, will furnish candles sufficient to light every house in the Confederacy for the next year. So, also, on every plantation, nay, in almost every kitchen, the monthly waste of ashes and grease, with the addition of a little lime and salt, and the labor of one person for one day, will make soap enough for our purposes. Now, why should we continue to pay the Yankee's 30 cents a pound for soap and 60 cents for candles?" Candles in war time were made of resin. A model, economical candle, sixty yards long, was recommended for the camp and for plantation purposes; it was said to burn six hours a night for six months, and all was at a cost of only a few cents. One pound of beeswax was added to three-fourths pound of rosin, and melted together; four threads of slack-twisted cotton was used for a wick, and drawn through the melted wax or rosin three or four times, was wound into a ball, which on pulling the end up and lighting, furnished a good candle.

Among the recipes for making soap that were published in the Southern papers, I note the following: 1. Yellow or rosin soap; dissolve one pound of concentrated lye in half a gallon of water and three and a half pounds of fat or tallow, and boil; put in three-fourths pound of powdered rosin, and let it boil down by constantly stirring until the soap sticks on the kettle and gets very thick. Put into a mould. 2. Hard fancy soap: Dissolve half pound of concentrated lye in two and a half pounds of hot water, and let cool; then melt by a low heat five pounds of clear fat or tallow; pour in the lye in a very small stream, and stir rapidly. Keep stirring until all has assumed the appearance of thick honey. Let it stand for 24 hours, when it will have set into a fine hard soap, which may be perfumed or variegated with colors by stirring in the desired perfume or coloring matter, just before covering. 3. Soft soap: one pound concentrated lye and three gallons soft water and five pounds of fat or tallow. Boil till the mass grows transparent and all the fat has disappeared. Add fifteen gallons of water and boil a few minutes, and the soap will be ready for use.

In making gunpowder the lighter woods, such as willow, dogwood and alder charcoal were recommended. I append an advertisement taken from the Augusta, Ga., *Chronicle* of 1862: "To Contractors—Willow wood wanted! 500 cords willow will be contracted for, to be delivered on the line of the canal at the government powder factory at Augusta, Ga., at the rate of not less than 100 cords a month, commencing 1st December next."

Out of the wood of the white poplar, split into shavings like tape or braid, the stuff called *sparterie* was made, used in the manufacture of hats. It was said that one workman with the aid of a child to carry off the shavings could keep a half dozen plaiters employed.

Shoes were made from canvas for uppers and tupelo wood for soles, for the negroes on the plantations. They had been patented, so it was said, by Henry Wyatt & Co., of New York, who offered wooden-soled brogans for the negroes of the South. Ropes and baskets were made from the bark of the Canada leatherwood.

The following was published concerning the sassafras tree: "The sassafras wood stripped of its bark is very durable and strong, resists worms, etc. It forms an excellent post for gates. Bedsteads made of it are never infested with bugs. The pith of the young shoots and the leaves contain much mucilage and are used extensively in New Orleans to thicken pottage and in making the celebrated "gumbo" soup.

A cheap and wholesome beer for soldiers, or as a table beer, is prepared from the sassafras. Take eight bottles water, one quart molasses, one pint yeast, one tablespoonful ginger and one and a half tablespoons of cream tartar; mix and stir in an open vessel after standing twenty-four hours. As far back as 1857 it was suggested in the Patent Office Reports (says a Confederate publication), that the Pyrethrum would be found to answer the purposes of destroying insects, lice, etc., on plants and animals, and up to now, as far as I know, this has not been sufficiently experimented with.

W. Gilmore Sims wrote a friend that "the persimmon beer made in Orangeburg, Dist., S. C., by Hon. J. M. Felder, equalled the best sparkling 'Jersey champagne,' or a carbonated cider. The old Southern song ran: 'Christmas comes but once a year, Eggnog and 'simmon beer.'" It was customary to mash the fruit, strain through a coarse seive, knead with wheat bran, and bake in an oven. This persimmon bread could be put away for winter use in making beer when wanted.

Cloth was rendered water-proof, according to a published recipe, by adding to one gallon of turpentine two and a half pounds of beeswax. Boil well in a pot, remove from the fire, and while it is hot put in the goods. Saturate well and hang to dry. Use one gallon turpentine to eight yards of cloth.

A correspondent in the Charleston *Mercury* wrote from Waresboro, Ga.: "You speak of black moss for mattresses. Our common palmetto leaves, split into shreds with fork and hackle, boiled, dried in the sun a few days, make a light, clean, healthy and durable mattress. Let me suggest that palmetto pillows would be light and comfortable for our soldiers on the coast. Their corn and flour sacks, in the absence of anything better, furnished ready-made pillow ticks. Our negroes are busily employed making light, durable and handsome palmetto hats for our soldiers. A bed made from the downy swamp plant, which our people call "cat's tail," took a premium at a late agricultural fair in South Carolina.

I enumerate a few more medicinal uses that were made of some of the products of our southern fields and forests by our physicians and housewives, and will close.

Phytolacca decandra, or poke, was largely used in diseases affecting the scalp, and in ulcers, irruptions, itch and hemmorhoids. Knot grass was considered a powerful astringent in diarrhœa and uterine hemorrhages. Water pepper, says a writer at Manchester, S. C., was used in his family in 1862 in dysentery, and every case was improved and cured. Mountain laurel was employed with claimed success in rheumatism, gout and glandular enlargements. Black alder used as wash in cutaneous troubles. Holly leaves used as an emetic, and birdlime made from the middle bark. Love vine used as a laxative tea. Pinckneya pubens, Georgia bark, useful in intermittent fevers. It is said that "Dr. Fair detected a considerable amount of cinchonine in it, but was prevented from continuing his examination."

Woodbine was given in asthma, and a decoction of the flowers administered to calm the pain of colic following child-birth. A decoction made by pouring boiling water over the leaves, flowers or berries of the elder bush was used as a wash for wounds to prevent injuries from flies. Sea myrtle was used in popular practice in South Carolina as a palliative and demulcent in consumption and coughs, a strong decoction given several times a day. Rag-weed used in whisky in place of quinine in Maryland. Cat weed employed in popular practice in diseases of chest and bowels. Hound's tongue employed in domestic practice as a mucilaginous drink, and the roots made into a poultice in case of bruises, sprains, etc. Gravel root given as an emetic. Horse nettle used as an aphrodisiac among the negroes. Virginian silk used as a diuretic decoction in gonorrhea. The buds and inside bark of the long-leaved pine and bits of pine steeped in gin were favorite domestic remedies in coughs and colds, and as a diuretic.

What I have here collected has been put together in a busy season and during the war excitements that have just been engaging the attention of all our people. The result is not intended as a complete history of the conditions named. It could, necessarily, only be a part of the history of those conditions.

In designing this paper, I had hoped to make it more complete by using contributions from surgeons of the Confederate army and navy, and druggists engaged in business during the period, so far as they were living and from papers to be loaned me by them. Out of scores of letters addressed to living men of this character, I received but few replies. In obtaining some of the matter, railway trips had to be taken, and much of it was collected at considerable expense and labor. When it is remembered that the conditions that are suggested here lasted for a period of nearly four years, then the sufferings and the achievments and the heroism of seven millions of people are in a measure made manifest.

If I have succeeded in recalling by way of suggestion some facts that in the present may be of use, or in the future may be evolved into utility, I will have been rewarded for my outlay and my efforts.

The war of 1861–1865 is now but a memory. The heroes of both sides —those "tented" on "fame's eternal camping ground" and the survivors— are now dear to a re-united people, who, proud of the common victories of their fellow-countrymen at Manila and Santiago, and rejoicing in the vigor of American arms and the glory of American ideals, stand expectantly awaiting and hopefully facing the great future in store.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION—WEDNESDAY MORNING, AUGUST 31, 1898.

The Section was called to order by Chairman Kremers at 10:00 a. m., but being in conflict with the adjourned session of the Section on Commercial Interests from the night before, upon motion the Section adjourned to meet Thursday morning at 10:00 o'clock.

SECOND SESSION—THURSDAY MORNING, SEPTEMBER 1, 1898.

Chairman Kremers called the Section to order at 10:00 a. m.

Dr. Lyons was invited to take the chair, while the Chairman read the following address:

CHAIRMAN'S ADDRESS.

After much deliberation, I have concluded not to attempt to review in the short time at my disposal the progress that has been made in recent years in the chemistry of that group of semi-natural products commonly known as volatile or essential oils. The temptation to discourse briefly on the recent developments of chemical nomenclature pertaining to the subject I have resisted, because this phase of the subject would be too technical for a mixed scientific audience. The subject to which I invite your attention, and for which I pray your indulgence, is rather of a didactic character and contains elements which I hope are not devoid of interest, not only to the botanist and chemist, but also to the pharmaceutical practitioner who has not specialized in either science, but who takes pleasure in the development of the science of pharmacognosy.

Pharmacognosy is comparable to geography in the breadth of its scope; it touches upon, and even partially overlaps, almost all of the sciences, general and special. It is of such intense interest because it touches man in so many of his relations. As a science, however, it has not advanced as far as chemistry and botany. It has not reached that advanced stage of generalization which botany permits, much less has it advanced to the position of a deductive science, which chemistry is more and more attaining. The chemical effects of pharmacognosy are still largely those of the chemical lumber room.

Less than fifteen years ago, Professor Wallach, then of the University of Bonn, now of Goettingen, began to create the semblance of order in one small corner of this great lumber room, a corner which has attracted the attention of chemists ever since there has been a science of organic chemistry. The fragrance as it were of this corner, seems to have attracted the attention at some time of almost all European organic chemists of international repute. However, it required the diligence of the bee rather than the flitting of the butterfly to create sufficient order so as to make this work permanently attractive and replete with interest. Chemists all over the world are now devoting no small share of their time to the classification of old material and the discovery of an almost overwhelming mass of new material. To-day much of this material is no longer in the chemical lumber room, but has found either a permanent or at least a temporary position in our system of chemical classification. How this imperfectly classified material may assist us in the study of pharmacognosy, is what I should like to demonstrate in an imperfect manner in the limited time at my disposal. In doing this, I shall try to avoid the attitude of the specialist as much as possible.

To begin with, let us take up several of the more important families that are liberal producers of volatile oils; the conifers, the labiates and the umbellifers. The botanist will notice at once that whereas almost all parts of the conifers yield volatile oil, the leaves and flowers of the labiates are rich in oil, but the root, stem and fruit are almost devoid of volatile constituents. On the other hand, the fruit of the umbellifers is probably the principal organ in this family which yields an essential oil. The botanist may also arrange the oil-producing plants of a single natural order and thus obtain sub-orders which produce oils and other sub-orders or genera which seem to be devoid of volatile oil. Care should, however, be taken not to draw false conclusions, physiologically speaking, from such plant classifications. A plant though fragrant may not contain enough volatile constituents to pay for the commercial distillation of an oil, or even attract the attention of the scientist to undertake a difficult investigation.

But it is the chemical phase of our subject to which I especially desire to call your attention. For reasons before mentioned, I shall not attempt to enumerate all of the oil-producing plants of these three natural orders, nor shall I attempt to give all of the constituents that have been found in the oils to be enumerated. As a basis for these data, I have selected Dr. Gildemeister's table, No. 1, appended to Heusler's monograph, "Die Terpene."

TABLE NO. I.

		Pinene.	Linonene.	Phellandrene.	Camphene.	Sylvestrene.	Bornyl acetate.	Thujone.	Fenchone.	Cadinene.	Sesquiterpene.	Cedar camphor.
Juniperus virginiana, L........	Leaves.											
" "	Wood.										—	—
(Cedarwood oil, Corinto)........	"											
(" " Cuba)..........	"									—		
(" " La Plata)	"											
(" " Punta-Arenas)...	"									—		
Cedrus libanotica, Lk..........	"											
Juniperus sabina, L............	Leaves.	—								—		
Thuja occidentalis, L...........	"	—						—	—			
" *orientalis*, L.............	Root.											
Juniperus communis, L.........	Fruit.	—								—		
Abies pectinata, D. C............	Leaves.	—	—				—				—	
" " "	Cones.	—	—									
Pinus pumilio, Haenke..........	Leaves.	—		—		—	—			—		
" *palustris*, Michaux........	Wood.	—										
" *pinaster*, Soland	"	—										
" *sylvestris*, L..............	"	—	—			—						
Larix europaea, D. C	"	—										
Picea vulgaris, Lk.............	Leaves.	—	—	—			—			—		
Abies canadensis, L.............	Leaves and twigs.	—			—		—			—	—	
Pinus sylvestris, L. (Ger.).......	Leaves.	—				—	—			—		
" " " (Sw.).......	"	—				—	—					

A moment spent in addition will show that the twenty-two oils enumerated in this table have revealed but eleven of their constituents to the chemist thus far. For reasons mentioned in this introduction, this list has not been brought up to date. For our present purpose it will do as well as a complete list. It will be seen at once that pinene occurs in more than one-half of the oils enumerated. Most of those oils in connection with which it is not mentioned have not been examined chemically. Furthermore, the table shows that pinene apparently has a tendency to occur with one or several of its isomers, together with bornylacetate or a sesquiterpene, or both.

It would be dangerous, however, to draw any more definite conclusions. The present methods of the chemist often fail in identifying a given constituent when contaminated with other substances from the same oil. By way of illustration, let me call attention to the single occurrence of camphene recorded in Table 1. Although camphene is a solid when pure, up to a few years ago it practically defied identification when mixed with pinene or other isomers occurring in the same oil. Under favorable circumstances, its presence can now be ascertained by its conversien into isoborneol. In the presence of much pinene, however—and this, as you see, is very common in the oils from this family—its identification is no easy matter, because of the formation of borneol and terpineol, which obscure the presence of small quantities of isoborneol obtained from camphene by the acetylization method.

Even pinene sometimes escapes recognition. The speaker has shown (Proc. Wisc. Pharm. Ass'n.; also, "Am. Chem. Journal") that highly optically active pinene is not apt to yield a crystallizable nitrosochloride, through which this hydrocarbon is now almost universally identified.

Attention may finally be called to the absence of borneol esters in that group of oil coming from cupressineæ and the predominance of high molecular constituents as far as this group of oils has been examined.

Viewed from a chemical or plant physiological standpoint it may be worth mentioning that a genetic relation seems to exist between some of the constituents enumerated, Pinene has been termed the "father of terpenes." If dry hydrogen chloride is added to it, pinene hydrochloride results. Upon splitting off hydrogen chloride from the latter, pinene is not regenerated, but camphene results. Camphene adds hydrogen chloride to form camphene hydrochloride or bornyl chloride, which is, according to the reagents employed convertible into camphene or borneol; the latter upon oxidation yields camphor.

If, however, moist hydrochloric acid, or still better, diluted nitric acid, be allowed to act on pinene, representatives of a different group of compounds, viz., the limonene group, are formed: terpineol and its esters, terpin and its esters, terpin hydrate, limonene or dipentene, etc.

We know, however, that Cl-ions and ONO_2-ions are exceedingly poisonous toward plants, so that our laboratory experiments may reveal genetic relations chemically speaking, but not genetic relations in the biological sense of that term. This is almost unquestionably true as far as the experiments just mentioned are concerned. It is necessary, however, to supplement them by an important observation. If acetic acid is employed in place of mineral acids before mentioned, the reaction takes place in both directions: acetates of both borneol and terpineol are formed. The general course of reactions alluded to thus far can be more readily grasped by referring to the schedule printed below.

These so-called inversions by no means exhaust the chemical possibilities in this direction, but they may serve to illustrate the possible genetic relationship referred to.

The careful observer may be inclined to ask why it is that terpineol or its acetic ester are not mentioned in Table 1. First let me repeat once more that the genetic relationship to which your attention was called was only termed a possible one; secondly, it is necessary to state that terpineol, like camphene, is by no means always readily identified. Whatever the weak points of such speculation may be, they have the merit of joining isolated facts. The didactic value of such teaching in preference to mere memorizing will certainly not be questioned.

Let us now proceed to our second family, the labiates, as shown in Table 2.

TABLE No. II.

		Acetic aldehyde.	Isovalerianic ald.	Lactone $C_{10}H_{16}O_2$.	Menthol.	Menthyl acetate.	Menthyl isovalerianate.	Menthone.	Linalool.	Linalyl acetate.	Geraniol.	Geranial.	Menthene.	Pulegone	Borneol.	Bornyl acetate.	Camphor.	Thujone.	Terpineol.	Cineol.	Pinene.	Limonene.	Phellandrene.	Camphene.	Carvone.	Patchouli alcohol.	Cymene.	Thymol.	Carvacrol.	Hydroquinone ethyl ether.	Cadinene.
Ocimum Basilicum, L.	Herb.																														
Cunila mariana, L.	"																											—			
Origanum vulgare, L.	"																														
Thymus Serpyllum, L.	"																											—	—		
Hyssopus officinalis, L.	"																														
Nepeta cataria, L.	"																														
Mentha viridis, L.	"																								—						
Lavandula vera, D. C.	"								—	—	—									—?	—?	—									
" *dentata*, L.	"																			—											
" *Stoechas*, L.	"																			—											
Lycopus virginicus, Michx.	"																														
Origanum Majorana, L.	"																														
Melissa officinalis, L.	"											—																			
Mentha aquatica, L.																															
" *arvensis*, L.																															
" *canadensis*, L.																															
Monarda punctata, L.																												—			
Pogostemon Patchouli, Pellet																										—					
Mentha piperita		—	—	—	—	—	—	—					—							—	—	—	—								—
" *pulegium*, L.														—																	—
Hedeoma pulegioides, Pers.														—																	
Rosmarinus officinalis, L															—		—			—	—										
Salvia officinalis, L															—			—		—	—										
" *sclarea*, L.										—																					
Satureja Thymbra, L.																—					—	—					—	—			
Origanum spec									—																		—		—		
Lavendula spica, Chaix									—		—?				—		—		—?	—		—		—							
Thymus vulgaris, L.									—							—					—						—	—	—		
" *camphoratus*, H. & Link.																													—		
" *capitatus*, Link.																—					—	—					—	—	—?		

If we look at this table in the light of the observations made in connection with the first table, we again find pinene almost invariably associated with borneol or its acetic ester. A similar relation seems to exist between cadinene and patchouli alcohol, both of which occur in the same oil. Of special interest is also the occurrence of cymene with either thymol or carvacrol, or both. Thymol and carvacrol are isomeric phenols of the hydrocarbons. It is of interest to note in connection with these phenols that, in certain plants at least, they have a capacity of replacing each other under conditions not yet determined.

If we group the oils according to species of the same genus we find a remarkable similarity in the oils of the species of the genus thymus and of the genus lavandula. On the other hand, the oils of the different species of the genus mentha reveal no such striking similarity in chemical composition as far as their constituents are known.

TABLE No. III.

		Octyl propionate.	Octyl butyrate.	Linalool.	Terpineol.	Fenchone.	$C_{10}H_{16}O$.	Pinene.	Limonene.	Phellandrene	Carvone.	Cymene.	Thymol.	Cuminic Ald.	Anethol.	P. methyl oxypropyl benzene.	Cadinene.	Apiol.
Ptychotis Ajowan, D. C. ..												—	—					
Dorema Ammoniacum, Don.																		
Archangelica off., Hoffm...										—								
Archangelica off., Hoffm...										—								
Pimpinella Anisum, L....															—	—		
Ferula Asafœtida, L......							—	?									—	
Ileum athamanticum, Jacq.																		
Coriandrum sativum				—				—										
Cuminum Cyminum, L...												—		—				
Daucus Carota, L........					?			—										
Anethum graveolens, L....									—		—							
Fœniculum vulg., Gaertner.						—		—	—	—					—			
Ferula galbaniflua, B. & B.																	—	
Carum Carui, L.........									—		—							
Levisticum off., Koch.....																		
Imperatoria Ostruthium, L.																		
Ferula Sumbul, Hooker ..																		
Balsamodendron Kafal?..																		
Pastinaca sativa, L		—	—															
Apium petroselinum, L....								—										—
Peucedanum grande																		
Pimpinella Saxifraga, L..																		
Apium graveolens, L......									—									
Phellandrium aquaticum, L.								—	—	—								

Whereas the labiate oils show on the whole a rather varied composition—our table shows thirty constituents from thirty different oils—the umbelliferous oils (Table 3) again reveal a somewhat simpler composition. The only new point which I desire to emphasize is the relationship between limonene and carvone. Carvone is limonene, $C_{10}H_{16}$, in which two hydrogen atoms have been replaced by a carbonyloxygen atom. Hydrocarbon and ketone occur side by side in several volatile oils. It is of special interest to note that whereas both compounds contained in the umbelliferous oil of caraway are dextrogyrate, the same chemical substances occur in the labiate oil of spearmint in the lævogyrate modification.

In the laboratory the hydrocarbon can be converted into the ketone in the following somewhat roundabout way: Limonene is converted into its nitroso-chloride in the usual manner.

$$C_{10}H_{16}+NOCl=C_{10}H_{16}\left\{\begin{matrix}NO\\Cl\end{matrix}\right.$$

The nitrosochloride readily splits off hydrochloric acid, yielding so-called nitroso limonene or carvoxime.

$$C_{10}H_{16}\left\{\begin{matrix}NO\\Cl\end{matrix}\right.=C_{10}H_{14}NOH+HCl$$

Carvoxime, upon hydrolysis, yields carvone and hydroxylamine.

$$C_{10}H_{14}NOH+H_2O=C_{10}H_{14}O+H_2NOH$$

Pinene, when treated in a similar manner, does not yield an isomerie ketone, but the metameric carvacrol. Compare the occurrence of pinene and carvacrol in the oils of Thymus vulgaris and capitatus.

In tabulating the constituents found in the oils from the one family, a different arrangement of these constituents may not only be considered proper, but advisable, because of the various points that are to be emphasized. In a general summary of these constituents, however, only one arrangement seems practicable, and that is the one based upon modern chemical classification.

Organic chemistry is sometimes defined as the chemistry of the hydrocarbons and their derivatives. It requires a rather dogmatic turn of mind to feign to see a fundamental difference between these two definitions. Although both definitions are practically identical, the latter may be given the preference for purely didactic reasons, because it emphasizes the fundamental character of the hydrocarbons in the study of the carbon compounds. If we, therefore, satisfactorily classify the hydrocarbons we have succeeded in classifying in a general way almost all carbon compounds. Now, hydrocarbons are classified first of all according to their degree of saturation; secondly, according to their claim of cyclic character, and finally according to the number of carbon atoms.

To carry out this classification in all of its details is impossible at present because of the large number of instances in which the molecular structure has not yet been ascertained. The material contained in the three tables will suffice, however, to demonstrate its general applicability. With the aid of the formulas of saturation, the constituents found in the oils of the three families which we have studied can be arranged in the following manner:

C_nH_{2n+2}
Acetic aldehyde
Isovalerianic aldehyde
Ethyl butyrate
Octyl acetate
Octyl propionate

C_nH_{2n-4}
Pinene
Limonene
Phellandrene
Camphene
Sylvestrene
Carvone

C_nH_{2n}
Menthol
Menthyl acetate
Menthyl isovalerianate
Menthone

C_nH_{2n-6}
Cymene
Thymol
Carvacrol
Hydroquinone ethyl ether
Cuminic aldehyde
Cadinene
Sesquiterpene

C_nH_{2n-2}
Linalool
Linalyl acetate
Geraniol
Geranial
Menthene
Terpineol
Pulegone
Borneol
Bornyl acetate
Camphor
Thujone
Fenchone
Cineol.

$C_nH_{2n-?}$

Apiol

C_nH_{2n-8}

Anethol

$C_6H_4 \left\{ \begin{array}{l} OCH_3(1) \\ CH:CH\,CH_3(4) \end{array} \right.$

P. methyl oxypropyl benzene

$C_6H_4 \left\{ \begin{array}{l} OCH_3\ (1) \\ CH_2CH:CH_2(4) \end{array} \right.$

The compounds enumerated under the formula of saturation, C_nH_{2n+2} belong to the paraffin series, the only series under this formula.

Under the next formula of saturation, C_nH_{2n}, we find no members of the olefine or ethylene series in the three families under consideration, but members of only one of the several cyclic polymethylene series.

Under the third formula of saturation, C_nH_{2n-2}, we find the unsaturated chain compounds linalool and its acetate, geraniol and the corresponding aldehyde, geranial, with two double bonds, but no representation of the acetylene series. Menthene, terpineol and pulegone are unsaturated cyclic compounds with one double bond. Cineol is a therodicyclic compound with no double bond. Borneol and necessarily its acetate and the corresponding ketone, camphor, also thujone and fenchone are still open to more or less doubt as to their mono- or di-cyclic character.

The representatives under the formula of saturation C_nH_{2n-4} are either mono-. di- or even polycyclic. The constitution of three of them is fairly well understood, though by no means beyond reasonable doubt.

Under the formula of saturation C_nH_{2n-6} the first five are representatives of the benzene series, the last two are evidently polycyclic.

The two isomeric compounds under the last formula of saturation C_nH_{2n-8} have a benzene nucleus, but one of the side chains is unsaturated.

One of the compounds, apiol, is not sufficiently known to be arranged under any formula of saturation.

The material at hand is but meagre, being derived from only three families, yet is sufficient to serve by way of contrast. Let me quote from one of our standard works on pharmacy which is not more guilty in this respect than many other works of a similar nature. I shall omit the definition, for I have commented on the practical indefinability of a volatile oil last year. As to their chemistry, our author states that "they," namely volatile oils, "may be divided into four classes: 1. Terpenes. 2. Oxygenated oils. 3. Sulphurated oils. 4. Nitrogenated oils." Again: "Proximately volatile oils consist of two principles, which differ in their point of volatilization or congelation, or in their composition. They are termed stearopten and eleopten."

You will pardon me for saying that such classifications are not only unscientific, but that they are worse than worthless. The student who commits them to memory carries away a totally wrong impression: "Doch ein begriff muss bei dem Worte sein?" the student mentally asks, and the Mephisto of the text-book replies, with a remarkable appreciation of the truth of the situation:

> Schon gut! nur muss man sich nicht allzu aengstlich quaelen:
> Denn eben wo Begriffe fehlen,
> Da stellt ein Wort zur rechten Zeit sich ein.
> Mit Worten laesst sich trefflich streiten,
> Mit Worten ein System bereiten,
> An Worte laesst sich trefflich glauben,
> Von einem Wort laesst sich kein Iota rauben.

Some three or four years ago, after I had given a course of lectures on hydrocymenes and derivatives, a student came to me with the examination questions, of a college of pharmacy published in one of the pharmaceutical journals. He asked me to answer the question: "What is a terpene?" I replied: "A terpene is a terpadiene." He saw the point, smiled, and went away satisfied. It is remarkable with what tenacity we cling to systems that have outlived their usefulness decades ago.

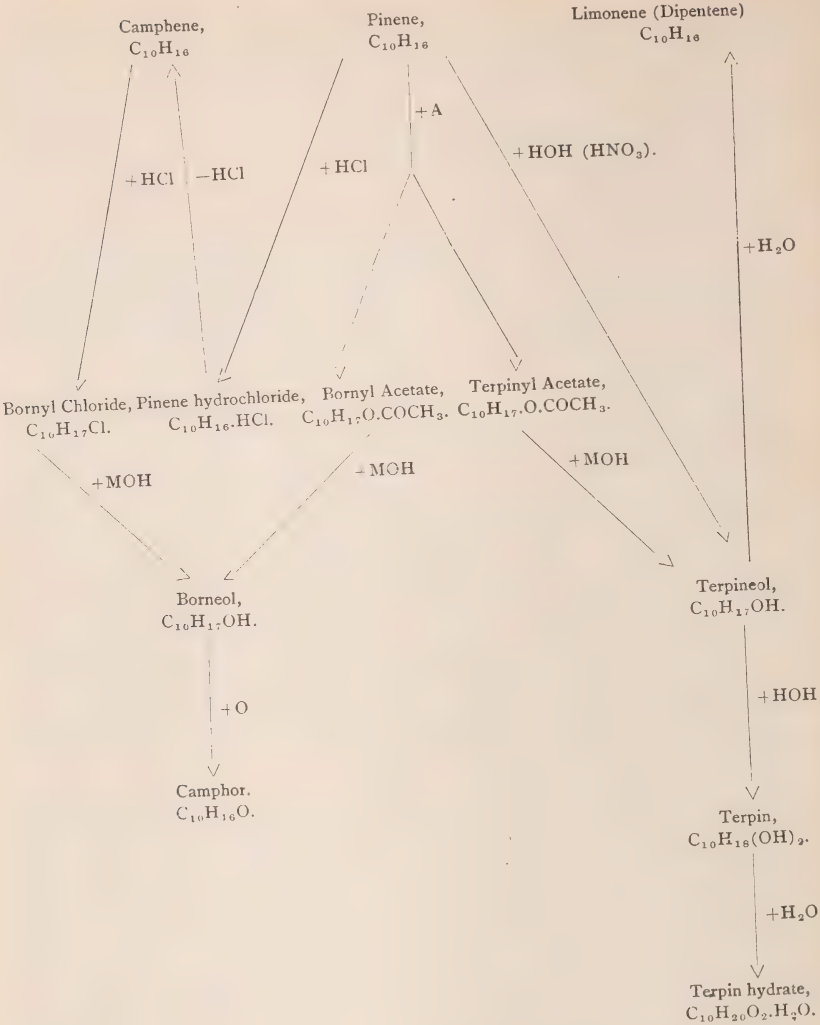
Though antiquated, this system has earlier in this century served a perfectly justifiable purpose. It is difficult to discuss seriously, however, several attempts made in two pharmaceutical journals during the past year. We may regret that pharmaceutical treatises are frequently written by a single person, when they should be assigned to three or more authors; but as long as publishers are willing, we have no right to blame the single author for not being up to date in the various branches of physics, chemistry and biology. However, if a person writes an article for a journal on a special subject, one has a right to expect of him a knowledge of at least some of the elements of that subject. In order to demonstrate that I am not combating imaginary foes of pharmaceutical science, permit me to cite a few quotations.

A writer who, several months ago, commented on the essential oils of the British Pharmacopœia, states that "the essential oils are composed chiefly of substances belonging to the benzene series." Now, out of thirty-nine substances enumerated in our table, only six are members of this series. He then states that "the body to which most of these bodies are most nearly related is cymene." But two of the substances under consideration are directly related to cymene; both thymol and carvacrol are hydrocymenes. Menthene, which may be termed a tetra-hydrocymene is no closer related to cymene than ethane is to acetylene, though with the same propriety the former may be considered a tetra-hydroderivative of the latter. The relation between menthol and thymol is not much closer than that existing between normal hexyl-alcohol and phenol. A certain general relationship exists between all things in nature, and its recognition indicates the philosophic mind; but for purposes of classification man and the monkey are no more placed in the same group than the historian will classify our modern colonial dame with King Arthur, although she claims direct descent.

The second writer referred to informs us that "the number of scents is very great;" that "at least five hundred can be distinguished. On attempting to classify them and to state their qualities one meets with a serious difficulty, for language is not rich enough to give names to all of the different kinds. There are flowers sweet at night and scentless in the day; flowers of evil odor at one hour and fragrant at another," etc. He then goes on to inform us that "the need of bringing this multiplexity into something like order has long been felt, but hitherto sufficient attention could not be given to the need, because the chemical properties of the scents, which must serve as a basis for any scientific division, are only little known." He then produces what he chooses to call a "first attempt" and divides all vegetable and animal "scents" into three, viz., the paraffin, benzene and terpene groups.

To classify the damask rose "scent" with the paraffin group, because the oil contains, among other substances, a mixture of inodorous paraffin hydrocarbons, is rich indeed, and ought to make the Turkish adulterator smile. But it requires considerable "yellow" cheek to place ambergris, civet and musk into the paraffin group. The perfect care with which oils that have not yet been distilled are classified according to their chemical composition, which our writer informs us "must serve as the basis for any scientific division," is indeed astounding. It would be sheer waste of time to go any further into the details of this remarkable "first attempt" at a chemical classification of "scents."

You will pardon the critical attitude I have drifted into, but as chairman of the Scientific Section, I have but one recommendation to make; let us honestly combat the evil tendencies of a dangerous "Halbbildung."


Camphene, $C_{10}H_{16}$
Pinene, $C_{10}H_{16}$
Limonene (Dipentene) $C_{10}H_{16}$
+HCl
−HCl
+HCl
+A
+HOH (HNO_3).
+H_2O
Bornyl Chloride, $C_{10}H_{17}Cl$.
Pinene hydrochloride, $C_{10}H_{16}.HCl$.
Bornyl Acetate, $C_{10}H_{17}O.COCH_3$.
Terpinyl Acetate, $C_{10}H_{17}.O.COCH_3$.
+MOH
+MOH
+MOH
Borneol, $C_{10}H_{17}OH$.
Terpineol, $C_{10}H_{17}OH$.
+O
Camphor. $C_{10}H_{16}O$.
+HOH
Terpin, $C_{10}H_{18}(OH)_2$.
+H_2O
Terpin hydrate, $C_{10}H_{20}O_2.H_2O$.

It might prove of interest to take up the chemistry of some of the substances partially classified under formulæ of saturation. Not only does the time at my disposal not permit this, but such a procedure would scarcely be in harmony with the object of this address. As stated in the introductory remarks, my object was not to present an array of facts, nor even the very latest information on the subject, but to show how those facts which may be considered the common property of all in a broader sense than that of the specialist, may be utilized in the study of a science which appeals to all of us, no matter what our specialty. To further take up chemical details would, therefore, not be consistent with the expressed purpose of these remarks.

It seems almost unnecessary to add that the enumeration of the volatile oils containing, for example, pinene or thymol or camphor under these headings should form a part of the study. The study of the distribution of these and of other substances in the vegetable kingdom will again give material for further valuable generalizations, imperfect though they may be at present. With the material from but three families as the basis for our present study, it would be unwise to more than merely suggest this feature.

I fear that I have already taxed your patience in expecting you to listen to a subject which some of you may not consider of great practical importance. However, their lies not only a charm in rational generalization; it is, as a rule, productive of useful results. Pharmacognosy, so long a science of isolated facts, is about to outgrow this youthful stage, and with the aid of the underlying sciences to step into a period of scientific manhood. Every contribution that assists in bringing about this change, no matter how trifling when compared with others of greater importance, is worthy of our thoughtful consideration.

The Chairman accompanied the reading of his address with interesting blackboard illustrations of his subject, and at the close he was greeted with very hearty applause.

DR. LYONS: Gentlemen, the address of the Chairman is before you. What will you do with it?

DR. RUSBY: I move that the paper be referred to a Committee for discussion or action on the recommendations or suggestion.

MR. SAYRE: I think there are some suggestions worthy of consideration, and I second Dr. Rusby's motion.

The motion to refer to a Committee of three was carried.

DR. LYONS: I will ask Dr. Rusby, Mr. Sayre and Mr. Stevens to act as such Committee. That Committee will report this afternoon.

Mr. Kremers resumed the chair.

THE CHAIRMAN: The next order of business is the nomination of officers for the ensuing year. Nominations are in order for the office of Chairman.

MR. SAYRE: I should like to place in nomination as Chairman of this Section Dr. H. H. Rusby, of New York.

MR. WHELPLEY: I second the motion.

DR. RUSBY: Mr. Chairman, I must decline to act as Chairman of this Section. I am willing to do my part as a member, but not to act as Chairman next year.

Dr. Rusby was finally prevailed upon to accept the nomination. The Chairman having called for nominations for the office of Secretary, Mr. Sayre presented the name of Henry V. Arny. No other nominations were made at this Session.

THE CHAIRMAN: Reports of Committees are next in order. The first is that of the Special Committee on Research. Copies of the report have been distributed.

On motion of Dr. Rusby, seconded by Dr. Lyons, consideration of the Report of the Research Committee was deferred until the afternoon session.

THE CHAIRMAN: We will now have the report of the Committee on Revision of the United States Pharmacopœia.

Mr. Eliel read the report, as follows:

REPORT OF COMMITTEE ON THE REVISION OF THE UNITED STATES PHARMACOPŒIA.

To the Officers and Members of the American Pharmaceutical Association:

Your Committee on the Revision of the United States Pharmacopœia beg leave to submit the following:

1. *Linimentum Saponis.* This should be made from dried soap shavings, as the powdered soap found in the market is not, as a rule, made from pure olive oil soap.

2. The present standard of chlorinated lime is too high, and should be reduced to 30 per cent.

3. It has been stated that if syrup made from crystallized rock candy be used in the preparation of Syrup of Hydriodic Acid, it will keep perfectly. Investigation is desired.

4. The following list of drugs are described as being inodorous: Aconite, Apocynum, Aspidosperma, Bryonia, Chirata, Colchicum Root, Colchicum Seed, Colocynth, Geranium, Cotton Root Bark, Pomegranate, Hamamelis, Kamala, Kino, Leptandra, Linseed, Lycopodium, Mezereum, Nux Vomica, Pareira, Pumpkin Seed, Physostigma, Phytolacca Fruit, Phytalacca Root, Pulsatilla, Pyrethrum, Quassia, Quillaja, Cascara Sagrada, Rhus Glabra, Rhus Toxicodendron, Rubus, Sassafras Pith, Squill, White Mustard, Black Mustard, Taraxacum, Triticum, Veratrum Viride, Viburnum Opulus, Viburnum Prunifolium, Xanthoxylum, Zea. Most of these drugs have odors; some of them of a decided character, others not so characteristic, but sufficient to warrant dropping the term inodorous in most cases. We would recommend changing the description of these drugs as to odor, so as to read in some instances "inodorous," "almost inodorous," having a "characteristic odor," and such drugs having simply a woody non-characteristic odor, all mention of odor to be omitted.

5. *Salol* is described as "odorless," or having a faintly aromatic odor. Salol has a decidedly characteristic odor, and we recommend striking out the words "odorless or."

6. *Potassii Sulphas.* A paragraph giving identity for sulphate should be added, as follows:

A 5 per cent. aqueous solution of the Salt yields with Barium Chloride T. S. a white precipitate, insoluble in Nitric Acid.

7. *Digitalis.* It is claimed by Keller that the active principle is Digitoxin. By a process which he has worked out, he can separate the Digitoxin, Digitalin and Digitonin. Keller claims that Digitonin is ineffective on the heart or circulation, but that Digitoxin is very active physiologically. He has not determined the value of Digitalin. As this is a valuable and important drug, we recommend that this be taken up by the Committee on Research, they to report a process of assay based on Keller's method of separation, and they to separate the three substances in quantity and determine which are physiologically active.

8. *Aloes.* Socotrine Aloes possesses no special claim to official recognition, and should either be superseded by Curaçoa Aloes, or the latter should be given recognition in the United States Pharmacopœia.

Socotrine Aloes yields about 8 per cent. aloin, and Curaçoa Aloes will yield up to 18 per cent. Aloin. Commercial Socotrine Aloes are frequently mixed with Curaçoa Aloes, owing to the fact that they cost much less, and the latter should be substituted for the less efficient and at present official variety. It being very easy to determine Aloin, an Aloin standard should be set up for Aloes, and a general heading, "Aloe," be substituted for all varieties, using only such as come up to that standard.

9. *Aloin.* No standard of purity exists in the United States Pharmacopœia, principally because the name Aloin is not an entity or individuality. It presents a class of

preparations which may be homolcgues and are derivatives of the same same mother substance—Anthraquinone, Socaloin, Curaçoaloin, Barbaloin, Capaloin, etc. These should be examined, purified, and their melting point when purified established. The difference between them should be established, and determination made of their relative physiological efficiency.

10. *Podophyllin.* There is no reason why Podophyllin should not be official as such in the United States Pharmacopœia. It is largely used all over this country. It is a definite substance, and we recommend its adoption in the United States Pharmacopœia. Also that a process be given for podophyllin content of Mandrake Root, and a standard set up for same.

11. *Liquor Plumbi Subacetatis.* The working formula for this is unsatisfactory, and we recommend the substitution of the working formula of the German Pharmacopœia.

12. *Sodium Sulphate.* This should be deprived of its water of crystallization, as being more uniform and stable.

13. *Tinctura Ferri Chloridi.* We recommend changing the direction of letting it stand at least three months, to read at least twelve months, inasmuch as an important part of its therapeutical value depends upon ethers which are very slowly generated.

14. We desire to refer to paragraph 17 of our report of 1896, which was not acted upon at that time: Dismiss all Tinctures having a Fluid Extract of the same drug official, and all Fluid Extracts having a Tincture of the same drug official, and substitute for such Tinctures and Fluid Extracts a 50 per cent. Tincture under a DISTINCTIVE title.

15. Your Committee further recommends the establishment of a scientific laboratory, employing chemists and pharmacologists by the year to carry on investigations on the lines indicated by the National Committee. Such a laboratory would be of great benefit to the pharmacists and physicians of this country, as well as a great credit.

It is the opinion of this Committee that a laboratory with all the modern equipments on a fairly large scale should be established at Washington where the assistance of the Government chemists, library and facilities could be had; such laboratory to have facilities for the working of four or more chemists under guidance of one of them as director, and for the working of one pharmacologist, who should have a separate but adjoining room to the chemical laboratory, and work conjointly with them and under guidance of the general director. If the Revision Committee has not sufficient money at its disposal, and cannot obtain it, no doubt the pharmacists and manufacturing establishments of the country will make up the defieiency.

We recommend a general discussion of this suggestion at this meeting, and its adoption as the sense of this Association representing the pharmacists of this country.

16. *Spirit Nitrous Ether.* It has been stated that the addition of Glycerin retards deterioration. Investigation is desired, and report of results requested by your Committee.

17. *Crude Carbolic Acid.* There is no crude acid obtainable in the market which will comply with the tests and requirements of the United States Pharmacopœia, and we recommend that the requirements be modified.

LEO ELIEL,
A. R. L. DOHME,
FREDK. K. DRAKE,
A. B. STEVENS,
J. O. SCHLOTTERBECK.

The report, on motion, having been duly received, the recommendation of the Committee in regard to changing the official description of certain drugs as to odor was discussed at some length by Messrs. Lowe, Sayre, Whelpley, Eccles, Mayo, Arny, Alpers, Lyons and Lloyd, without arriving at any definite action.

On motion of Dr. Bartley, the recommendation to refer the assay of Digitalis to the Special Committee on Research was adopted.

The desirability of reducing the official requirements of Chlorinated Lime from 35 to 30 per cent. was discussed by Messrs. Gane, Stevens and Scoville.

Finally, upon motion of Mr. Sayre, seconded by Mr. Gane, the whole report was referred to a committee of three for consideration. The Chairman appointed Messrs. Remington, Coblentz and Kraemer as said Committee.

Mr. Diehl next read in abstract the Introductory to his Report on the Progress of Pharmacy, which was, on motion, received and referred to the Committee on Publication.

The Chair announced that the next order of business was the reading of papers, and gave an explanation of the practical difficulty in the way of complying strictly with the by-laws requiring the printing of papers in advance of the meeting of Sections. He also commented upon the practice that prevailed with members of having some papers printed before being submitted to the officers of the Section for approval, and said that he deprecated that practice.

DR. WHELPLEY: I move that a committee of three be appointed to investigate the matter of publishing papers before being accepted by the officers of this Section.

The motion was duly seconded and carried.

DR. RUSBY: I would suggest Dr. Whelpley, and would ask him to select two associates.

DR. WHELPLEY: I will select Dr. Rusby and Mr. Alpers.

Mr. Diehl then read the report of the Committee on National Formulary, which had been referred to this Section, as follows:

REPORT OF THE COMMITTEE ON NATIONAL FORMULARY.

To the American Pharmaceutical Association:

Since the publication of the revised edition of the National Formulary, following their last report, which was presented to the Association at the Asheville meeting in 1895, your Committee have not considered it necessary until now to make a report, believing that the best interests would be served if time were given to make practical trials of the formulas, so that criticisms, commendatory or otherwise, might be made intelligently. It seemed desirable, also, to ascertain to what extent the Formulary had fulfilled its mission to serve as a standard and guide for the practitioner of medicine; whether its preparations have in any degree replaced corresponding proprietary preparations heretofore popularly prescribed, and what steps have been taken by individuals and associations to popularize the "Formulary" among physicians.

After now nearly three years of trial, it may be stated that as a whole the Formulary has met with approval, and its formulas have been followed with satisfaction. It is true, as Prof. J. W. Sturmer says in a paper read before the Indiana Pharmaceutical Association, "that this Formulary is far from perfect; neither are Shakespeare's dramas or Milton's immortal epic; but the object to be gained is so great that we can afford to sacrifice our pet formulas, even though they be better than the corresponding National Formulary formulas—a case which, however, does not occur very often." Prof. Sturmer makes these remarks in connection with what he considers a proper plan to combat the inroads made by the manufacturers of pharmaceutical specialties upon the business of the pharmacist, and they are, therefore, in line with the object for which the "Formulary" was created. He maintains that "the pharmacists throughout the land must agree upon a common standard—which in his opinion should be the National Formulary—before they can look forward to success; then by banding together in their respective localities, and by properly presenting their claims to the physicians, who must be regarded as being their friends and not their enemies, they can doubtless regain some of the territory they have lost." Judging from comments and criticisms that have appeared since the revised Formulary has appeared, this fairly represents the opinion of the pharmacists of our country.

The one point which we find frequently voiced, is that the Formulary does not cover the ground as completely as is desirable. As mentioned, however, in the preface to the revised edition (p. IV), this demand in most cases is for working formulas for preparations that have come into current use under fanciful trade-names, and for which no formulas, other than the obscure indications of composition borne on the labels, are known to pharmacy. This Committee does not now see any reason for changing its opinion, expressed in the preface, that it is not within the scope of its duties to devise and construct formulas for such preparations, but that they will gladly consider and experiment with any new formulas that may be proposed. Speaking of the work done by the Committee on Unofficial Formulas of the Illinois Pharmaceutical Association, that Committee expresses the opinion that they could do much more effective work if the members of the Association were to make their wants known as to the character of the formulas required. Your Committee believes this to be an important suggestion, which, if carried out by the different State Associations, will enable the Committee on National Formulary to revise future editions so as to cover the ground to the satisfaction of pharmacists in every locality in our country. That additional formulas are necessary is shown, not alone by individual contributions scattered through the pharmaceutical journals, but also by special formularies which have been published. Attention is here drawn to a Formulary issued by the Cincinnati Academy of Pharmacy, in connection with an epitome of some of the formulas of the National Formulary. These formulas—thirty-seven in number—have been placed at the disposal of your Committee, and will doubtless receive proper consideration when a new revision is decided upon.

All proper methods of popularizing the National Formulary are so desirable that your Committee feel some delicacy in criticising this little volume of the Cincinnati Academy of Pharmacy; but it is a matter of regret that the epitome of the National Formulary is incomplete and therefore not what it claims to be by its title, and that the cover of the little book makes no reference to "The Academy of Pharmacy Formulary," though the two are distinctly separated and provided with title pages. The privilege of preparing epitomes of the National Formulary has been given freely, on request, to several local and state associations, and these have doubtless done much to familiarize the medical profession with this important adjunct to the U. S. Pharmacopœia. In the opinion of your Committee, however, it would have been better if the Association instead of recommending had given positive instruction to the Council and Committee on National Formulary that an epitome of the National Formulary be published for distribution to the pharmacists (see Proceedings 1895, p. 57).

We would recommend: 1. That the Committee on National Formulary be instructed to prepare an official epitome of the National Formulary, to be published in the name of the Association by the Council. 2. That the different State and Local Pharmaceutical Associations be invited to subscribe for as many copies as they may find desirable for distribution, such subscription to be accompanied by a remittance covering an established price which is not to exceed — percentum in excess of actual cost. 3. That the editions of the epitome be printed at least once a year, so that associations and individuals may avail themselves of the opportunity to obtain a supply at moderate cost; or that some other suitable arrangement be made for this purpose. 4. That a copy of the epitome be supplied to the members of the Association with the Proceedings of each year.

If some such plan be followed, it is believed that an epitome of the National Formulary will soon be in the hands of nearly every physician—an important factor in efforts to popularize the Formulary. In order to identify the distribution of the epitome with the local or other associations, a certain space on the cover and title page should be devoted to the legend, "With Compliments of the ——— Association," etc.

Your Committee are furthermore of the opinion that, while complete revisions of the National Formulary should not be frequent, there is a necessity for the frequent addition of new formulas. This might be accomplished by issuing supplements from time to time, either by themselves or in connection with the epitome—the latter plan offering the advantage of securing a wider distribution at comparatively little expense.

Abundant evidence has come to the Committee that whenever and wherever the attention of physicians was properly called to the Formulary, it was received with favor and many of its preparations soon came into use. Reports from different localities show that in many instances the National Formulary preparations have replaced the corresponding proprietary preparations, and we can, therefore, with confidence look forward to a more general acceptance of the Formulary as a standard and guide for the prescriptions of medical practitioners, and to an eventual fulfillment of its mission.

Finally, your Committee desires to call attention to the necessity of making the Formulary more accessible to the pharmacists of the country. Some of them do not even know of its existence; others do not know to whom to apply when they wish to purchase a copy. It is very recently that an inquiry came from a small interior town, inclosing a letter from the editor of a prominent pharmaceutical journal, in which the writer was directed to the Chairman of this Committee for information concerning the source of supply of the National Formulary.

Respectfully submitted, C. LEWIS DIEHL, *Chairman.*

MR. DIEHL: I expected to meet some of the members of this committee here and submit this report to them, but not a member of that committee is present except myself.

DR. WHELPLEY: I do not desire to complicate matters, but I am exceedingly anxious to see the suggestions contained in that report not lost sight of before this Section. I move that it be referred to a committee of three, to report at the next general session of the Association.

The motion was duly seconded and prevailed.

The chairman appointed as such committee Messrs. W. S. Thompson, C. B. Lowe and W. L. Scoville.

The reading of papers being next in order, Mr. Lloyd read a letter from Prof. Fennel to the Chairman of the Research Committee, as having a direct bearing on his own paper, which followed.

CINCINNATI, *July* 11, 1898.

PROF. A. B. PRESCOTT, *Ann Arbor, Mich.:*

Dear Sir: Yours under date of the 7th inst. to hand, and in reply permit me to state that I have examined many samples of mustard, both white and black, foreign and domestic, and in view of the results obtained, I would suggest the following additions to the pharmacopœial requirements:

White Mustard. The crushed dried seed when exhausted with ether should yield not less than 25 per cent. of fixed oil.

The crushed dried seed when boiled with ten times its weight of water for two minutes and allowed to cool, should not be colored blue by iodine test solution.

The crushed dried seed when macerated with cold water for 15 minutes should not evolve the odor of the volatile oil of mustard.

The ash should not exceed 5 per cent.

Black Mustard. The crushed dried seed when exhausted with ether should yield not less than 30 per cent. of fixed oil.

The crushed dried seed when boiled with ten times its weight of water for two minutes and allowed to cool, should not be colored blue by iodine test solution.

The crushed dried seed when macerated with cold water for 15 minutes should evolve the pungent odor of the volatile oil of mustard.

The ash should not exceed 5.5 per cent.

Remarks. The per cent. of fixed oil in no instance fell below the specified percentages.

Both White and Black Mustard occasionally gave faint traces of starches after long and continued boiling, due to the presence of foreign seeds, not intentionally added. By proper methods of sifting, these can be removed. Manufacturers of Mustard Flour claim that these extraneous seeds are removed with difficulty, owing to their size approaching that of the Mustard. I find that the starch-bearing seeds are somewhat smaller, and consequently readily removed. The question of expense should not enter into a pharmacopœial product. By the term cold water, under production of volatile oil, is meant water at 20 deg. C. A limit of strength for volatile oil is desirable, but I know of no simple and accurate method. The method of the German Pharmacopœia gives results varying upon the same product between 0.5 per cent. and 1.2 per cent. The per cent. of ash of clean seed is rather uniform, and always between the factors given.

As to Acacia I am at sea. I was in hopes of fixing a standard of purity by the per cent. of ash, but the variations were so great that I have given that factor up as worthless. The pharmacopœial test for starch is satisfactory, while the color reaction of dextrin does not necessarily indicate its presence. In this connection I should like to offer a suggestion; namely, that the Chairman of the Committee obtain authenticated samples of products desired for examination. I have had samples from reliable and trustworthy houses, and yet I have had my doubts as to products sent. Large manufacturing concerns I believe have better opportunities for acquiring products of known source than jobbers, but these concerns pay but little attention to requests from outsiders, and consequently examinations do not furnish the desirable data. With kindest regards,

Yours truly, CHAS. T. P. FENNEL.

STANDARDS FOR WHITE AND BLACK MUSTARD SEED.

BY JOHN URI LLOYD.

The work was undertaken solely with a view to establish a standard concerning starch in powdered black and white mustard seed. Although starch is not a constituent of ripe mustard seed, it has been found in commercial powdered mustard,* and under conditions that preclude the idea of intentional admixture. The presence of starch-bearing weed seeds, and of scattered grains of wheat or of contaminations caused by using second-hand sacks with adhering flour or meal, will account for such reactions. It is therefore desirable that a method should be found that will approximately indicate the proportion of starch.

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* Bulletin of Pharmacy, 11, p. 64.

BLACK MUSTARD SEED.

The ordinary method of detecting starch by adding Iodine Test Solution, U. S. P. to the aqueous decoction fails with black mustard, on account of the ready absorption of iodine by the oil of mustard that is at once developed when black mustard comes in contact with water. This fact was pointed out by the author* in 1895.

If iodine solution is added, and much starch is present, a blue coloration is developed which remains for a short time only, then fades and disappears. A considerable excess of iodine, however, will effect a more permanent blue coloration, but affords no test concerning the proportion of starch.

If small amounts of starch are present, iodine will show no blue color at all. Hence, the necessity of a rapid and convenient method by means of which a permanent starch reaction can be obtained, even when small quantities of starch are present.

Preliminary Work.—The idea of abstracting the disturbing element sinigrin, by means of solvents prior to the testing for starch, was soon abandoned as impracticable and hopeless. Then it was attempted to precipitate the sinigrin by means of the salts of heavy metals, such as silver nitrate, mercurous nitrate, or lead acetate, with no satisfaction.

By subsequent and prolonged experiments with copper sulphate, however, it was shown that this substance has the capacity of preventing the formation of oil of mustard, even when employed in as weak a solution as 0.2 per cent. This reaction, however, is not new. ‡

Acting upon this fact and carrying the principle further, we were enabled to arrive at several useful working methods for starch detection in mustard, among which those yielding the most satisfactory results are herein presented.

I. IODINE METHOD.

This method was suggested in our report † of 1895. It is easy of execution and rather sharp in reaction. We would suggest for it the following slightly modified directions :—

Put into a large test tube 1 gm. of the ground black mustard seed, add 10 cc. of water and 1 cc. of Iodine Test Solution, U. S. P. Boil until the brown color has disappeared. Cool the liquid and add (by means of a pipette) one drop of Iodine Test Solution, U. S. P., allowing it to flow down the side of the test tube and mix gradually with the upper part of the liquid. If as little as 0.1 per cent. of starch is present, a distinct and quite permanent blue or greenish blue layer appears in the upper part of the fluid, which by contrast is very perceptible.

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* Proc. Am. Pharm. Assoc., 1895, pp. 194–199.

‡ P. Carles, Pharm. Jour. & Trans. [4], 6, p. 73.

† Proc. Am. Pharm. Assoc. 1895, pp. 194–199.

II. COPPER METHODS.

A. Copper Sulphate and Iodine. Solutions:—(1) Copper sulphate solution (0.2 per cent.). Dissolve 1 gm. of pure crystallized copper sulphate in water to make 500 Cc. of solution.

(2) Solution of Iodine (2 per cent.). Iodine Test Solution U. S. P.

Directions.—Put 1 Gm. of the powdered black mustard into a perfectly dry test tube, add 10 Cc. of the (0.2 per cent.) copper solution and boil. No odor of mustard oil will be developed. Cool and add from one to three or four drops of iodine test solution, allowing it to flow down theside of the test tube, taking care to leave a layer of un-iodized liquid below, in order that the contrast in color may be observed. The upper layer will turn blue if as little as 0.3 per cent. of starch is present.

Remarks.—The copper solution recommended is sufficiently dilute to offer no interference with the color reaction on account of its own blue color. It was found that at no practical concentration (beginning at 2 per cent.) does the color of the copper solution interfere with the sensitiveness of the test. This strength (0.2 per cent.) is sufficient to prevent the formation of oil of mustard even upon boiling, and we prefer it to more concentrated solutions.

By careful manipulation the presence of 0.2 per cent. of starch can be distinctly demonstrated by this test. Yet from 0.3 per cent. upward the starch test by this method is exceedingly plain and quite permanent. An excess of iodine will cause the precipitate to become green, which must be especially borne in mind when testing for small quantities of starch.

B. Copper Sulphate and Potassium Iodide. Solutions:—(1) Copper sulphate solution (0.4 per cent.). Dissolve 4 Gms. of pure crystallized copper sulphate in water to make 1000 Cc.

(2) Potassium iodide solution (5 per cent). 5 Gms. of crystallized pure potassium iodide are dissolved in water to make 100 Cc.

Directions.—Put 1 Gm. of the powdered black mustard seed into a perfectly dry test tube, add 10 Cc. of the copper solution and boil. Cool and carefully add by means of a burette about one half cubic centimeter of the above solution of potassium iodide. After a short time, an exceedingly plain and decidedly permanent starch reaction will be developed near the bottom of the tube in the presence of as little as 0.3 per cent. starch.

Remarks. — This test is based on the interesting reaction that takes place when copper sulphate and potassium iodide are brought in contact. Insoluble white cuprous iodide is formed and iodine is liberated according to the following equation:—

$$2CuSO_4 + 4KI = 2K_2SO_4 + Cu_2I_2 + I_2.$$

The iodine liberated produces the starch reaction.

Yet, the chemical reaction does not take place in too dilute solutions. The concentration of the liquids and probably other factors influence the speed and completeness of the reaction.

The above named proportions gave the most satisfactory results, and were established by a lengthy series of experimentation.

III. POTASSIUM IODIDE METHOD.

It was found during experimentation with the foregoing test that on boiling powdered mustard seed with potassium iodide solution, the formation of mustard oil is likewise entirely avoided. The idea that potassium iodide be used in the place of copper sulphate in the same manner as in the test II A. then suggested itself. On testing the boiled liquid, after cooling, with official iodine test solution, the result proved to be eminently satisfactory. To such an extent is this method in our favor that we now give it the preference over all others in the testing of powdered black mustard seed for starch.

Solutions:—(1) Potassium Iodide Solution (5 per cent.). 5 Gms. of crystallized pure potassium iodide are dissolved in water to make 100 Cc.

(2) Iodine test solution U. S. P. (2 per cent.).

Directions.—Put 1 Gm. of the powdered black mustard seed into a perfectly dry test tube; add 10 Cc. of the above potassium iodide solution and boil. Cool, and carefully add to the surface of the bright yellow liquid from one to three drops of iodine test solution, taking care in mixing with the iodine to allow it to flow down the side of the tube, upon the surface of the liquid. The contrast in color between the iodized part and the lower liquid is very striking, and is plainly visible with as little as 0.1 per cent. of starch.

Remarks.—The blue coloration by this method is perhaps not quite as permanent as in the copper experiments, yet it is sufficiently characteristic at the time of its formation, and for a reasonable time afterwards.

Summary for Black Mustard Seed.—(1) Four methods have been indicated, which we submit. As before stated, the potassium iodide test (Test III) seems to us to be preferable.

(2) The potassium iodide test (Test III) indicates the presence of 2 per cent. of starch with all certainty, and of 0.1 per cent. by closely observing the contrast in color.

(3) Hence the following recommendation is made:—

(a) If not more than 1 per cent. of starch (in the form of starch-bearing seeds, etc.) is considered admissible in black mustard of commerce, the Pharmacopœia should demand that:—

When mixed thoroughly with nine times its weight of powdered black mustard and previously ascertained to be free from starch, the mixture, if submitted in the quantity of one gramme to the test indicated under Test III, should not give a plain blue starch reaction.

(b) If it is desirable to make the pharmacopœial limit lower than one percent. of starch, a correspondingly smaller amount of starch free mustard seed should be added.

(c) If pure black mustard free from starch is demanded by the United States Pharmacopœia when submitted to Test III, it should show no blue reaction.

WHITE MUSTARD SEED.

The odor of oil of mustard (allyl mustard oil) is not developed when powdered white mustard is boiled with water, a fact which the researches of Dr. Gadamer* and his predecessors sufficiently explain. Yet, with powdered white mustard seed containining starch, the starch-iodine color also disappears, but less rapidly than it does with black mustard seed.

Fortunately, we find that the use of solution of iodide potassium with white mustard likewise checks the evanescence of the starch reaction when it is employed in the manner directed for black mustard seed under Test III. Indeed, when applied to white mustard seed, the test is even more sensitive by far than with black mustard, for by means of it we can detect the presence of as little as 0.05 per cent. starch with certainty.

Testing White Mustard for Starch. Solutions:—(1) Potassium iodide solution (5 per cent). 5 gms. of crystallized pure potassium iodide are dissolved in water to make 100 Cc.

(2) Iodine test solution United States Pharmacopœia. (2 per cent.)

Directions.—Put 1 Gm. of the powdered white mustard seed into a perfectly dry test tube, add 10 Cc. of the above potassium iodide solution and boil. Cool and carefully add to the surface of the bright yellowish liquid one drop of iodine test solution U. S. P., taking care in adding iodine to allow it to flow down to the side of the tube, upon the surface of the liquid. The contrast in color between the iodized upper part and the lower liquid is plainly visible with as little as 0.05 per cent. starch, in which case the coloration of the upper part is decidedly bluish and is permanent for a reasonable length of time.

Summary for Powdered White Mustard Seed.—(a) If not more than 1 per cent. of starch (in the form of starch-bearing seeds, etc.) is considered admissible in white mustard of commerce, the Pharmacopœia should demand that:

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* Dr. J. Gadamer, Ueber die Bestandtheile des schwarzen und des weissen Senfsamens. Archiv der Pharmacie, 235, pp. 44--114.

The sample be mixed thoroughly with twenty-four times its weight of powdered white mustard seed previously ascertained to be free from starch; the mixture, if submitted, in the quantity of one gramme to the test indicated under white mustard, should not give a plain blue starch reaction.

(b) If a lower limit is desired by the Pharmacopœia, a correspondingly smaller amount of starch-free white mustard seed should be employed in making the dilution.

(c) If pure white mustard free from starch is demanded by the United States Pharmacopœia, it should show no bluish coloration whatever when submitted to the same test.

In conclusion, the author extends sincere thanks to Dr. Sigmond Waldbott, Librarian of the Lloyd Library, for detailed assistance both in experimentation and in literary research.

On motion, the letter and paper were received and referred to the Publication Committee.

Mr. Lowe: I have been much interested in the paper of Mr. Lloyd. The late Prof. Maisch contended to the end of his life that starch was not present in fully developed mustard seed, and battles have been fought over this question. As I understand Mr. Lloyd's conclusion, he maintains that starch is only found in unripe mustard seed, or in seed contaminated by being placed in former flour containers. I would call your attention to an addition which I think should be made to the definition of the two mustards in the United States Pharmacopœia. It should be this, that "only tepid water should be used in making mustard plasters." My reasons for this change are well known to science, but not to the laity at large. Synaptase, the ferment principle present in both mustard seeds, is coagulated by heat, and thus placed in an inert condition, so that it cannot act upon the glucosides sinalbin, or sinigrin, and cause their splitting up, and thus form the acrid oils to which the blistering properties of the mustards are due.

Mr. Arny read the following paper on Aromatic Waters:

AROMATIC WATERS.

BY H. V. ARNY.

Of the aromatic waters of the Pharmacopœia, six are directed to be prepared from the volatile oil with the aid of inert absorbent material, with the hope of creating greater solubility by minute subdivision of the oil.

What absorbent material is best adapted to this purpose has been a question of much discussion and uncertainty, and accordingly we see it changed in successive Pharmacopœias from magnesium carbonate to absorbent cotton, and from the latter to precipitated calcium phosphate, which is the absorbent directed by the present Pharmacopœia. Hearing complaints from practical pharmacists that the waters manufactured by the process of 1890 do not keep so well as those made by the absorbent cotton process of 1880, that they showed in shorter time the presence of microscopical organisms, the writer prepared, in December, 1897, the six waters in question by the processes of the two Pharmacopœias, and examined the same in July, 1898, seven months later. The method of storing the samples was as nearly as possible that in vogue in a retail pharmacy, the waters being kept in 100 Cc. bottles filled to the shoulder, corked and capped with paper. At the same time samples of each were placed in similar 100 Cc. bottles and stoppered with merely a plug of absorbent cotton. After seven months' rest, each sample was examined, and wherever a precipitate had occurred (invariably a flocculent one, showing cellular structure under the microscope), it was collected on a tared filter and weighed, after being kept at the temperature of 100 ° for an hour.

The following table shows the influence of time, not only as to quantity of microscopic growth, but also as to approximate strength of odor. Those marked "a" designate the water in corked bottles; "b" being those stoppered with cotton.

		Odor.	Precipitate in 100 Cc. (expressed in milligrams).
Anise,	1880 a	strong	none
	1880 b	faint	none
	1890 a	strong	0.5
	1890 b	faint	none
Camphor,	1880 a	strong	none
	1880 b	very faint	0.4
	1890 a	medium	0.6
	1890 b	very faint	1.8
Cinnamon,	1880 a	strong and modified	trace
	1880 b	faint	none
	1890 a	medium	none
	1890 b	faint	none
Fennel,	1880 a	faint	0.8
	1880 b	odorless	none
	1890 a	medium	1.3
	1890 b	odorless	0.7
Peppermint,	1880 a	strong	none
	1880 b	faint	none
	1890 a	strong	trace
	1890 b	very faint	0.5
Spearmint,	1880 a	strong	none
	1880 b	strong	none
	1890 a	strong	none
	1890 b	strong	none

As no attempt was made at sterilization of the waters, objection may be raised as to the scientific value of the data. Yet, representing the normal treatment of these products in the ordinary pharmacy, we may glean some facts of possible value.

It will be first noticed that cinnamon, peppermint and spearmint waters are comparatively stable, the specimens of the last named being almost as fine after seven months as on the day they were made.

Again, we see that using a plug of cotton as a stopper, unless accompanied by sterilization, is worthless, and even with the latter precaution, loss in strength is to be expected. Notice that in every case, save in spearmint, the cotton-stoppered waters were either odorless, or with faint odor.

Lastly, we find that out of the eight samples containing appreciable quantities of microscopical fungi, seven were made according to the method of 1890, and only one by the Pharmacopœial process of 1880. Hence there seems some reason for the complaint that the waters made by the former process do not keep as well as those made by the latter method.

The expression of strength of the samples by the terms "strong," "faint," etc., is so very vague that the writer endeavored to find a rational method of estimation of quantity of volatile oil in the waters under examination. Owing to complexity of the constitution of the several oils employed, any effort toward quantitative chemical estimation seemed useless, and the writer turned his attention to the physical separation of the oil from the water.

At first glance, the process seems simple, and easy it is to extract the oil from the water by agitating with ether or other suitable solvent; but difficulty was encountered in attempts to separate the oil from the extracting solvent, owing to the tendency of volatile oils to spontaneous evaporation.

Taking a mixture of oil of peppermint and water (2 to 1000) as the type, a large number of attempts at quantitative extraction were made. As solvents, ether, chloroform, benzin and rhigolene (B. P., 20° C.) were employed, and the separation of the oil from the solvent was attempted by evaporation between 30° and 40°; spontaneous evaporation; evaporation in closed vessels under gentle passage of a dried current of air both at ordinary temperature and with refrigeration; and lastly suction with the passage of the air over sulphuric acid. All showed loss of oil save the process last mentioned, in which there was always excess over the theoretical weight, despite total exclusion of moisture with calcium chloride, soda lime and sulphuric acid, and purification of solvents by redistillation and drying over exsiccated copper sulphate or metallic sodium, as occasion demanded. Accordingly, after several months' work, this line was reluctantly abandoned and means of indirect estimation were sought.

In surveying the field of volatile oils there is one which stands distinct by reason of its simple composition, one whose quantitative estimation is a matter of no great difficulty. This oil is that of gaultheria; methyl salicylate.

From this oil aromatic water was prepared by the calcium phosphate process directed for official waters by the Pharmacopœia of 1890; by the cotton process of 1880, the percolation being conducted at the rate of 30 drops a minute by simple agitation of the oil with water at ordinary temperature during two days and subsequent filtration; and lastly, by hot solution, the process being performed by heating the oil and water for fifteen minutes in a flask with upright condenser attached, the solution on cooling being filtered. This modification of the usual hot-water process is an improvement, in that the shaking of a hot flask is obviated and that the loss of oil by evaporation is reduced to the minimum. In all the methods employed, the pharmacopœial ratio of oil and water (2 to 1000) was followed.

The finished waters were assayed by the volumetric process of Simonson and Ewing (Proc. A. Ph. A., 40, p. 196) modified by Kremers and James (Ph. Rev., 16, p. 130), namely: Saponification with a definite quantity of normal volumetric solution of potassium hydrate and titration of the excess of alkali with decinormal acid. The difference in quantity of alkali before and after saponification represents the quantity employed by the oil of wintergreen, and this expressed in cubic centimeters of normal alkali multiplied by the methyl salicylate factor, 0.152, gives the quantity of oil, in grammes, in the sample.

The results of these assays were as follows:

Process.		Quantity of water used.	Amt. normal alkali used in saponifiction. (in Cc.).	Amt. of Oil in sample (in grammes).	Percentage of oil.
Calcium Phosphate	a	50 Cc.	0.23	0.03496	0.06992
	b	50 Cc.	0.22	0.03344	0.06688
Cotton	a	40 Cc.	0.16	0.02432	0.0608
	b	40 Cc.	0.17	0.02584	0.0646
Agitation with water	a	40 Cc.	0.16	0.02432	0.0608
	b	40 Cc.	0.17	0.02584	0.0646
Hot water with upright condensation	a I	50 Cc.	0.28	0.04256	0.08512
	a II	50 Cc.	0.29	0.04408	0.08816
	b	50 Cc.	0.23	0.03496	0.06992

Samples "a" and "b," in each case are from different lots, and it will be seen that each pair agree fairly well, except the two batches made by upright condensation, of which one sample contains about .07 per cent. of oil, and the other almost .09 per cent. This can be understood when it is stated that neither sample, despite repeated filtrations, was absolutely clear, and that sample "a" was a trifle more opalescent than sample "b." In each case, control experiments were made, and the only deviation was in the assay of sample "a," made by upright condensation, when between the two there was a difference of $\frac{1}{10}$ Cc. of decinormal solution, or a difference of .003 per cent. Provided an aqueous solution of oil of gaultheria can be taken as typical of all aromatic waters, the following conclusions may be deduced:

First. The quantity of oil actually dissolved by water is so small, that the various processes have but little advantage over each other on the score of strength.

Second. The cotton process yields a product no stronger than that made by simple agitation.

Third. Hot solution yields the most concentrated product, and even this, when absolutely clear, will be scarcely stronger than the calcium phosphate product.

Cleveland, Ohio, August 6, 1898.

MR. SAYRE: I consider that a very valuable paper, and move that it be referred in the usual way for publication.

The motion was carried.

Mr. Feil read a paper on the "The Time Limits in the Pharmacopœia:"

TIME LIMITS IN THE PHARMACOPŒIA.

BY JOSEPH FEIL, PH. G.

All drugs are essentially chemicals, and as chemicals are all prone to decompose under a vast variety of conditions, it is natural to expect that galenicals always containing several substances in intimate contact, and frequently a large number, should decompose to a greater or less extent from the moment that their preparation has been completed.

In a large percentage of the pharmaceutical preparations used to-day, deterioration or detrimental changes are so guarded against that they remain in almost perfect condition for a long time; but in another class containing important medicaments it has been found impossible to preserve them against destructive and serious regression, that not only render them worthless, but even dangerous substances when used as drugs.

In the case of this class of galenicals, the Pharmacopœia should establish not only clear methods which tend to prevent decomposition, but also state a *time limit* beyond which their use should be prohibited. I showed last year that tincture of iodine will remain about United States Pharmacopœia strength for a month if kept in an ordinary shelf bottle exposed to light, but two months when kept in a dark closet; hence such a time limit ought to be appended to the description of this preparation, and instructions added to prepare a quantity not larger than sufficient to supply the ordinary demand for this period.

Spirit of nitrous ether remains of fair strength for about three months after preparation; yet I have known a sample of this preparation manufactured by one of our best manufacturing pharmacists to assay only one-eighth strength, and on investigation discovered that the jobbing house from whom this article was purchased had had it in stock for two years, selling it only when the particular make was specified; with a date on the package, all interested would have used proper caution.

Diluted hydrocyanic acid deteriorates to one-half strength in six months, and it is so easily prepared by the second process of the United States Pharmacopœia, 1890, that no excuse can serve the dispensing of this important substance having practically no value, and a *time limit* would serve to prevent such action.

I have frequently noticed Sulphurous Acid in pharmacies with no odor. How long this preparation remains usable, I do not know.

Among other galenicals that could profitably be marked with *time limits* in addition to all other precautions to preserve quality, may be enumerated Syrup of Wild Cherry, Syrup of Althæa, Solution of Lead Subacetate, Camphor Water, Fennel Water, Anise Water, Diluted Nitrohydrochloric Acid, Solution of Hydrogen Dioxide, certain cerates and ointments, and others.

It would seem quite desirable likewise to order the yearly replenishing of the stock of such crude drugs, oils and chemicals as can not be made by ordinary methods to retain their virtues. This is practically accomplished in some European countries at present.

Cleveland, Ohio, August 1, 1898.

Mr. Stevens, duly seconded, moved that the paper take the regular course.

Carried.

Mr. Lloyd: In my opinion, it is not right for pharmacists to be held to a strength that has an existence only once in the life time of a preparation, and that immediately after it is made; and I advocate that the Pharmacopœia give us a limit of variation, but which will yet prevent adulteration. Many substances made by the pharmacopœial methods have the exact strength demanded by the Pharmacopœia only once during their existence, and that the day the preparation is made, and not the day afterwards.

Mr. Feil: Quite a number of druggists in Cleveland had to pay $75 because their tincture of iodine was only 5 per cent. below the strength required. In Ohio it is against the law. I have examined some tinctures, however, that were above the strength required. I have found preparations where the labels were marked "never deteriorates," and I have found that some of them were 25 per cent. higher than they ought to be. These variations are what led me to the idea of writing this paper. In the laboratories, for instance, you can make sweet spirit of nitre every day; it does not take over half an hour, and tincture of iodine can be made in fifteen minutes; but I do not think the druggist can do that; it is not practicable for him, and he should be given a fair show in this matter.

Mr. Lloyd: Mr. Chairman and Members of the Scientific Section, if it is proper at this time, I wish to bring before you in my feeble way a subject which I am sure will appeal to others when suggested; and I only regret that I have not the power of speech that some of our friends have, to bring this thought before you in the way it deserves to be introduced. We start from our various homes to the meetings of this society; we go to this or that part of the country, longing to meet our friends. We who have been attending these meetings these many years expect to meet many friends when we reach the point to which we are journeying. We do meet them; we shake hands with them; we spend a few days pleasantly together, shake hands aagin, and return to our homes—some of us never to meet again. Now, this Baltimore meeting has been to me one of pleasure and one of sorrow. It has been the same to others who are with us. And this fact is true of almost every meeting that I attend, for each year some hand is not there to be shaken. There is a feeling of sorrow always when we come and when we part; and I find to-day that one of the most lovable men I have ever known—one whom I have for many years looked up to—one who, in every relation of life with his friends, and in his family, had no superior—is not here to shake us by the hand and greet us with his kindly voice. I refer to Henry Trimble. And I think that from the Scientific Section, in which he has done his work, and where he loved to be with his friends in science, should come the expression of sorrow over his loss—an expression breathing our sincere regard for his virtues, and our deep regret at his untimely decease. I trust that it may be deemed proper to direct our Secretary to send to Mrs. Trimble a word from us—a word of sympathy in this her hour of great bereavement; and I hope that this will be done by this Section in this meeting.

MR. MAYO: I would like to speak of the fact that Prof. Trimble was one of the martyrs to science. He cheerfully gave up everything—all social recreation, all prospect of prolonging his life—and devoted himself so arduously to the line of research in which he was engaged that he undoubtedly cut short by many years a life of usefulness. I think that Prof. Lloyd has paid him an elegant tribute; and I am quite sure if his departed spirit could take any knowledge of what is doing here to-day, it would delight that spirit to know what has been said. I heartily second the motion of Mr. Lloyd.

MR. MOERK: We of the Philadelphia College of Pharmacy feel very much touched at the remarks of Prof. Lloyd and Mr. Mayo. We knew the worth of Henry Trimble; we knew what a manly man he was. We knew how he had the courage of his convictions, and never hesitated to give them expresaion. Gentlemen, we are very much obliged to you.

MR. SAYRE: While I feel that the motion as put will be acceptable to all, yet it seems to me that the motion might be put somewhat differently. I can not speak upon the general subject—it is too great a grief; but I would like to suggest that a committee of three, of which Prof. Lloyd shall be chairman, be instructed to prepare such a letter as has been suggested and send it to Mrs. Trimble.

MR. LLOYD: It seems to me that, with all due deference to Prof. Sayre's view, it would be to Mrs. Trimble and her children, whom I know personally, a more grateful expression if it came directly from the Section itself, rather than from a committee of the Section.

DR. LYONS: My suggestion would be that in presenting this matter to those who are most deeply interested, it would show most feeling on the part of the Association simply to send Mrs. Trimble a copy of the stenographer's report. Three speakers have had something to say, and it may be that there will be others; and if their remarks could be sent with a word of sympathy from the Society, it would perhaps mean more than anything else.

MR. SAYRE: I withdraw my motion.

MR. ARNY: I heartily second the motion now before the Section, in the name of Prof.

Trimble's boys. It has been my good fortune to have spent two years under his instruction, and I never found a man who was so inspiring. With all due respect to my other teachers, I have never known a man who followed his students as he did. What I have accomplished up to this time of my life was at the recommendation of Prof. Trimble; and when I heard of his death when I came here, I was deeply shocked, and could not enjoy the meeting. I wish to second all the remarks made here in reference to his virtues.

MR. REMINGTON (coming into the hall): I understand that you are about to pass some resolutions on the subject of Prof. Henry Trimble's death. I can not tell you, gentlemen, what a shock the news of his death was to those of us who knew him well—although in some respects it was not an unexpected event.

It may interest the members to know that Prof. Trimble was one of those devoted men that no inducements from his friends could persuade to lay down the work he loved so well and take a much-needed rest. He was that devoted to his profession; he was that devoted to his work. Last May, knowing the condition in which he was, I wrote a letter begging him to go away. I knew very well what the result would be. He was continually failing in health and growing more and more emaciated. I wrote to him I thought he owed it as a duty to his family to go away. I saw him a few days afterward, and he said he had received my letter, and said to me, "I thank you very much. But I can not do it. I have my work here and it must be done. I know what the end will be probably, but I can not leave it." And he would not give up his work for a day, when he knew—I know that he knew—if he had taken a rest and gone out to Colorado he might have been here to-day and had several years longer of life. But he declined to go, such was his devotion to duty.

It may interest you to know that his suffering was not very great to the last, although he did suffer at the very last. Surrounded by his friends, with a loving wife at his side and a beautiful country spread out before him, he passed away; and I am sure he has left a record that any man might be proud of. The most unassuming of men, he was thoroughly energetic and never forgot his duty. He has gone from us; and when Prof. Lloyd suggested to me a short time ago that he would like to introduce a resolution in regard to Henry Trimble, I felt that this Section, of which he was an honored and useful member for so long, would be only too glad at this time, and in this place, to adopt such a resolution.

The resolution was carried by a unanimous rising vote.

On motion of Mr. Lloyd, the meeting adjourned to 3 o'clock in the afternoon.

THIRD SESSION—THURSDAY AFTERNOON, SEPTEMBER 1, 1898.

The Section was called to order at 3:15 p. m., by Chairman Kremers.

Upon motion, the reading of the minutes of the second session was dispensed with.

THE CHAIRMAN: According to motion adopted this morning, the report of the Special Committee on Research is now open for discussion.

DR. RUSBY: I move that it be referred to the Publication Committee.

Mr. Main seconded the motion, and it was carried.

THE CHAIRMAN: The next order of business is the reading of papers and their discussion.

Dr. Rusby read his paper on the "Generic Names of Plants," which elicited much applause.

A COMPARISON OF THE ENGLISH AND GERMAN WORKS ON THE GENERA OF PLANTS, WITH SPECIAL REFERENCE TO THE UNITED STATES PHARMACOPŒIA.

BY H. H. RUSBY, M. D.

The importance of system and consistency in such works as the Pharmacopœia has always received recognition through the selection by their compilers of authorities or codes, by reference to which doubtful or disputed questions are decided. In no department is there a more extensive demand for such formal treatment than in regard to the 200 or more species of plants which enter into our official work. These were consistently treated by the last Committee of Revision. The Rochester Code of Rules for Nomenclature, the fruit of a decade of study and discussion, was adopted, thus bringing the Pharmacopœia into harmony with the National Departments of Agriculture and Forestry and with the American Association for the Advancement of Science and the Botanical Society of North America. In classification, the Engish authority, the Genera Plantarum of Bentham and Hooker, was adopted, except as to cases of plain error. It was recognized that this work was seriously faulty in some ways, and that some of the changes necessary in following it were in themselves undesirable. Still, it appeared at the time to furnish the only complete work of the kind available. Since then the great German work, the Pflanzenfamilien of Engler and Prantl, has been practically completed, and it becomes a matter of necessity for the next Committee of Revision to consider the comparative merits of the two works as authorities. The publication of such works is not of frequent enough occurrence to make it likely that this necessity will again occur for a generation or more.

It is well to anticipate objections to changes in the Pharmacopœia by pointing out that any thus involved will not affect in any way the titles, working formulæ or processes, or anything else which touches medical or pharmaceutical practice, and cannot possibly disturb the convenience or safety of any one. They pertain to formulæ which concern only the accurate definitions of the titles, and, like the chemical formulæ, should always be kept as close as possible to absolute scientific accuracy. It would seem as though no reasonable objections could be filed against corrections of this character, although this has, hastily and thoughtlessly as it seems to me, been done, notably in the last edition of the U. S. Dispensatory.

While upon the subject, the exact number and nature of the changes which would be involved in adopting the German authority may be indicated. We note first that the species' names are not affected, as neither of these works treats of species, except incidentally, and then only in rare instances. The changes will extend only to family and genus names, the latter alone being of importance. Of generic changes there would be but eight at the most, and one of these I should regard as an error, and refuse to adopt it. This is the merging of the genus Cimicifuga into Actæa, by Dr. Prantl. It would appear to be a long step backward in classification to unite a genus producing dehiscent capsules with one yielding berries; and this, moreover, in the absence of any intermediate or connecting forms. The seven necessary changes thus left are as follows:

1. The genus Cydonia is maintained for the Quince.
2. The genus Dichopsis, yielding Gutta Percha, is referred to Palaquium.
3. The name Uragoga is restored to the genus yielding Ipecac.
4. The genus Exogonium, yielding Jalap, is restored.
5. Picræna, yielding Quassia, is referred to Picrasma.

6 and 7. The genus Sinapis is maintained as distinct from Brassica.

Three other generic changes are required, not on this account, but merely to correct errors in nomenclature. The name Leontice should have replaced that of Caulophyllum in the present edition of the United States Pharmacopœia, but for a slip by which the synonym was printed with authority, and the name was reduced. For Andira there is an older name, Vouacapoua, of Aublet. Chondodendron should be spelled Chondrodrendron. One other similar change proposed by Dr. Engler is based upon error, and cannot be adopted. He would substitute Schoenocaulon for Asagrœa on the basis of the date which has been published for Bentham's Plantæ Hartwegianæ. In a former communication to this Association, I pointed out that this date was erroneous, and that Asagrœa was the older name.

Turning next to the less important changes in family names, we find eleven of them, as follows: The Moraceæ are separated from the Urticaceæ, and include Cannabis and Ficus; the Ulmaceæ also are accorded family rank, and include Ulmus; Thea is referred to Theaceæ, Elettaria and Zingiber to Zingiberaceæ, Castanea to Fagaceæ, Chimaphila to Pirolaceæ, Erythroxylon to Erythroxylaceæ, Punica to Punicaceæ, and Krameria to Leguminosæ.

The total number of changes involved is thus seen to be eighteen.

If now we do not adopt the new authority, there are only two courses open to us. The first is to discard all authority, and to decide our cases independently. This would probably result in a much larger number of changes, for besides those above enumerated, American authority would probably separate Pulsatilla from Anemone, Leptandra from Veronica, Padus, containing the Wild Cherry, and perhaps Amygdalus also from Prunus, the division of the Liliaceæ into several families, especially separating the Smilaceæ, containing Sarsaparilla, the separation of the Lobeliaceæ from the Campanulaceæ, the division of the Leguminosæ into three families, the division of the Compositæ into three or more, and the isolation of the Krameriaceæ. Aside, therefore, from objections on principle to the Pharmacopœia Committee acting in a general way as an independent authority, such action might be deprecated as favoring an excessive number of changes. The only other course open to us is to continue to follow the English authority. To discuss this particular point is the object of the present communication. The question is so important that we cannot afford to restrict its discussion to the cases which are affected in the Pharmacopœia. It is essential that so influential a committee should inquire closely into the general merits of any system whose authority it proposes to accept.

The points of comparison between the two works may be advantageously divided into those relating to their nature as scientific productions and as books. Of the first-mentioned class we have the following:

1. The respective dates of publication. Fifteen years elapsed between the dates on which the two works were completed, and twenty-seven between those of their commencement. This average period of twenty-one years was astonishingly active and productive, both in the discovery of new material and in field, herbarium and laboratory study, and was ample for the revolutionizing of any such system.

2. The kind of study bestowed upon the two works. At the time of the preparation of the Genera Plantarum the comparative anatomy of plants was but little known—less so in England than almost anywhere else—and especially was its value as a factor in classification unrecognized, and the proposition to so use it held in contempt. It is true that Messrs. Bentham and Hooker gave great weight to habit in classification, and gave it a liberal interpretation, yet we cannot regard the epoch as having witnessed any extended application of the facts of plant anatomy, physiology, composition or properties to classification. Such has, however, been done in the Pflanzenfamilien of Messrs. Engler & Prantl. The classification of each family is preceded by an analysis of its morphology, anatomy, physiology, composition and properties, and to a great extent these subjects are treated comparatively, with regard to related families. The effect of such treatment upon the systematic result cannot well be over-estimated. It seems almost foolish to urge the saying that things which are different are not the same, and yet there are few principles which have been so generally violated, and with such disastrous results. In plant classification the principle has been almost general and professed of limiting comparison to differences of certain classes, and when these were wanting, of declaring the subjects the same, no matter how great the differences of other classes which might exist. The publication of the Pflanzenfamilien marks a new epoch in natural history in this direction; and its recognition, especially by Pharmacy, is imperative.

3. We notice that the classification of Engler & Prantl is made in view of the entire sequence of plants, for they treat Cryptogams as well as Phanerogams. Technically, of course, this view was not lacking to the authors of the Genera Plantarum, but the task of formulating the complete series in one work necessitated an attention to relationship which could not fail to exert an indirect influence even upon the recognition of relations between the Phanerogams themselves.

4. The number of persons engaged upon the two works. The Genera Plantarum is practically the sole product of the two authors whose names appear upon the title page and of Prof. Oliver, who ascertained a vast number of the facts upon which the classification depended. As a result of judgment of general relationship, it is chiefly the work of Mr. Bentham alone. In the case of Pflanzenfamilien, sixty authors divided the work, each taking up his portion as a specialty. The authors were specialists of a genuine kind, having first acquired general fitness and a broad grasp of natural relations, upon which their specialties were then grafted. It must be admitted that this difference does not tend wholly to the advantage of the more specialized work. An immensely greater amount of knowledge and thoroughness of treatment is secured, but with it a certain degree of diversity is inevitable. No considerable number of systematists can be gotten together who will not represent upon the one hand refined segregation, and upon the other broad unification. This of necessity introduces into such a composite work as the Pflanzenfamilien a more or less serious want of equality and uniformity in treatment, which is happily quite absent from the Genera Plantarum. It is, however, not nearly so conspicuous in the former work as was anticipated, and is not, on the whole, very serious. In any case it cannot appear as other than trivial when considered beside the advantages of intelligent specialization already referred to.

Lastly, we have the advantage in the Pflanzenfamilien of a rational and well-digested system of nomenclature, replacing the chaos of names of the Genera Plantarum.

The results of the more favorable conditions enumerated are strikingly apparent to one who uses the German work after having been accustomed for years to the use of the English one. We find, excluding the postscripts of both works, 280 families and 8,218 genera recognized by the new work, against 200 families and 7,316 in the old. Ten to twenty per cent. of this increase in genera is probably a fair allowance for discovery, the remainder being due to a greater amount of segregation, as the result of more thorough study of the composition of the genera. As to the increase in the number of the families, it must be credited almost wholly to the latter cause.

In connection with this change we note the almost complete disappearance of the hodge-podge families and genera which were characteristic of the Genera Plantarum, with the full recognition of its authors, and which have always constituted a subject of merriment. The Saxifragaceæ and Olacinaceæ were yawning waste-baskets which might receive any genera not subject to a clear understanding.

The change in the order of arrangement is so great as to constitute a sore trial to those who have become habituated to the older one. There can be no serious question, however, of its correctness. Relationships have been well studied, and however imperfect may be the attempt to form a natural sequence, it has been made, and its very failures will become the germs of discovery.

In view of the considerations above set forth, the writer has no hesitation in urging upon the Pharmacopœia Committee that they sustain their progressive record by adopting the authority of the modern work.

Before closing, I may say a few words concerning the merits of the two works merely as books. The results of this comparison are as unfavorable to the German work as our previous one has been favorable. Clumsiness, inconvenience and lack of common sense are grave faults in most German work, and introduced to one which requires to be used like the Pflanzenfamilien they tend to detract in a high degree from its usefulness. The first fatal error which we notice is in so dividing up the work that it becomes necessary to have several distinct indices for one volume. Directly upon the top of this the almost inconceivable folly has been committed of making no provision for finding the different parts of the volume, except by turning over consecutively more or less of a thousand pages, the classical German mehod of working. When the required part is found we naturally, and indeed of necessity, turn to its key to locate the required genus. Now we find that the key is broken up into a great number of parts and sub-parts, and that these are scattered from the first to almost the last page of the book. There is, it is true, a general key to the parts of the key, but there is nothing to indicate where these parts are to be found, and the page-turning method must be again resorted to. No index or key whatever is provided for the synonyms. Wherever the authors have substituted a new name for that by which the genus has previously been known, and such cases are very numerous, the only possible way to find it is to know in advance what the change is, and this is manifestly impossible in most cases. The successful use of a reference book thus constructed implies a perfect familiarity with its subject-matter, and it is obvious that exactly in proportion as this familiarity is possessed the necessity for using the book is absent. It is fair to judge that the authors did not have in mind the wants of those who were to use the book. Every one who has found it necessary to make any extended use of it has been obliged to expend an amount of labor in preparing indices and keys worth more than its original cost. In a postscript, a general index to the entire work is supplied, but this only in part atones for its want in connection with the different parts. The generic descriptions of the Pflanzenfamilien are of the most fragmentary character. Indeed, they can hardly be called descriptions at all, but mere diagnoses. The employment of illustrations is a redeeming feature, but this is very partial, and the figures are for the most part not well selected from the standpoint of the user's needs, however well they may accord with the specialized ideas of the authors.

Contrasting all this with the English work, we find the latter composed of three volumes, of seven parts, each preliminary part with a full index which is duplicated in the index of the volume. In these indices all synonyms (or the names treated as such) are printed in italics, those treated as names in Roman. Complete keys precede each family, the numbering of the genera affording a perfect means of reference. The amount of time required for doing reference work by this book is certainly not more than one-fifth of that required for the Pflanzenfamilien, and much of the latter cannot possibly be done at all, except by the aid of the Genera used as a key. When the required genus is found in the Genera we have a complete, systematic and orderly description, leaving nothing wanting to a decision.

I have devoted much time to the preparation of the accompanying comparative table, setting forth the composition and arrangement of the two systems, which will, I am sure, be found of assistance to botanists in various ways.

In it the names of the families are printed in the order of their occurrence in the Pflanzenfamilien. When the composition of the family is the same in both books, the number of genera which it is accorded in the Pflanzenfamilien is indicated in the third column of figures, that of the Genera in the fifth and last column. In the second column the consecutive numbers, as per Engler & Prantl, are printed, and in the fourth column of figures its position in the Benthamian sequence is indicated by figure. As the two works start at opposite ends of the series, it was necessary to reverse the order of numbering for the Genera Plantarum. Even this change does not give numbers which could be rationally contrasted with those in the second column, because one of the former is often the equivalent of several of the latter. Another column is therefore provided at the extreme left which constitutes the German equivalent of the corresponding family of the Genera. It is therefore clear that by comparing a number of the first with the corresponding one of the fourth column of figures we can judge of the relative positions of a family in the two works. Thus the thirty-fifth family of Bentham & Hooker is the first by Engler & Prantl. The first of the former becomes the tenth of the latter in point of order, though numbered the twentieth, owing to subdivisions of the preceding families. Various conditions prevented this comparison from being made absolutely accurate, but it is sufficiently near it for all practical purposes.

When Messrs. Engler & Prantl, in dividing up a family, have kept its component parts together, a brace, pointing to the corresponding Benthamian number, and another at the left pointing to the relative Englerian number, indicates the fact. When the component parts are separated, a parenthetical note follows, referring the reader to the number of the second column, where the complementary part or parts may be found. In such cases the abbreviation pp. (*pro parte*) will be found after the serial number, per Bentham & Hooker, of the fourth column.

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No., (reversed) Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
1	1	9	Cycadaceæ	35	9
	2		Bennettitaceæ		
	3		Cordaitaceæ Fossil		
	4		Dolerophyllaceæ		
2	5	1	Ginkoaceæ	36	32
	6	8	Taxaceæ		
	7	25	Pinaceæ		
3	8	3	Gnetaceæ	37	3
4	9	1	Typhaceæ (See 11)	11 pp.	2
5	10	2	Pandanaceæ	13	2
	11	1	Sparganiaceæ (See 9)	11 pp.	
6	12	9	Potamogetonaceæ	6	16
	13	1	Najadaceæ		
	14	1	Aponongetonaceæ		
	15	4	Juncaginaceæ		
7	16	10	Alismaceæ	7	12
	17	4	Butomaceæ		
8	18	14	Hydrocharitaceæ	34	14
9	19	2	Triuridaceæ	8	2
10	20	313	Gramineæ	1	298
11	21	65	Cyperaceæ	2	61
12	22	128	Palmæ	14	132
13	23	6	Cyclanthaceæ	12	4
14	24	105	Araceæ	10	98
15	25	3	Lemnaceæ	9	2
16	26	3	Flagellariaceæ	16	3
17	27	19	Restionaceæ	3	20
18	28	6	Centrolepidaceæ	4	4
19	29	1	Mayacaceæ	19	1
20	30	2	Xyridaceæ	20	2

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No. (reversed), Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
21	31	6	Eriocaulonaceæ	5	6
22	32	6	Rapateaceæ	17	6
23	33	40	Bromeliaceæ	30	27
24	34	25	Commelinaceæ	18	25
25	35	6	Pontederiaceæ	22	4
26	36	3	Philydraceæ	21	3
27	37	7	Juncaceæ	15	14
28	38	3	Stemonaceæ	24	3
29	39	197	Liliaceæ	23	187
30	40	9	Hæmodoraceæ	29	26
31	41	71	Amaryllidaceæ	27	64
	42	2	Velloziaceæ		
32	43	2	Taccaceæ	26	2
33	44	9	Dioscoreaceæ	25	8
34	45	57	Iridaceæ	28	57
35	46	6	Musaceæ	31	36
	47	24	Zingiberaceæ		
	48	1	Cannaceæ		
	49	12	Marantaceæ		
36	50	9	Burmanniaceæ	33	10
37	51	410	Orchidaceæ	32	334
38	52	1	Casuarinaceæ	43	1
39	53	3	Saururaceæ (See 98)	62 pp.	8
	54	9	Piperaceæ		
40	55	3	Chloranthaceæ	61	3
41	56	1 ?	Lacistemaceæ	40	1
42	57	2	Salicaceæ	41	2
43	58	1	Myricaceæ	44	1
44	59	1	Leitneriaceæ	46	1
45	60	1	Balanopsidaceæ	49	1
46	61	6	Juglandaceæ	45	5
47	62	6	Betulaceæ	42	10
	63	5	Fagaceæ		
48	64	13	Ulmaceæ (See 83)	48 pp.	108
	65	55	Moraceæ		
	66	41	Urticaceæ		
49	67	50	Proteaceæ	57	49
50	68	21	Loranthaceæ	53	13
51	69	1	Myzodendraceæ	52	28
	70	26	Santalaceæ		
	71	1	Grubbiaceæ		
52	72	7	Opiliaceæ (See 163)	156 pp.	36
	73	25	Olacaceæ		

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No. (reversed), Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
53	74	14	Balanophoraceæ (See 226)	51 pp.	14
54	75	5	Aristolochiaceæ	63	5
55	76	7	Rafflesiaceæ	64	7
	77	2	Hydnoraeeæ		
56	78	30	Polygonaceæ	67	30
57	79	75	Chenopodiaceæ (See 87)	70 pp.	80
58	80	40	Amarantaceæ	71	48
59	81	19	Nyctaginaceæ	73	23
60	82	1	Batidaceæ	68	1
	83	1	Cynocrambaceæ (See 64)	48 pp.	
61	84	23	Phytolaccaceæ	69	19
62	85	18	Aizoaceæ	122	22
63	86	17	Portulacaceæ	178	15
	87	5	Basellaceæ (See 79)	70 pp.	
64	88	70	Caryophyllaceæ	179	35
65	89	8	Nymphæaceæ	193	8
66	90	1	Ceratophyllaceæ	38	1
67	91	3	Trochodendraceæ (See 96)	197 pp.	
68	92	27	Ranunculaceæ	200	30
69	93	7	Lardizabalaceæ	194	19
	94	8	Berberidaceæ		
70	95	42	Menispermaceæ	195	31
	96	9	Magnoliaceæ (See 91)	197 pp.	9
71	97	1	Calycanthaceæ	198	2
	98	1	Lactoridaceæ (See 53)	62 pp.	
72	99	46	Anonaceæ	196	40
73	100	1	Myristicaceæ	60	1
	101	1	Gomortegaceæ (See 103)	58 pp.	
74	102	23	Monimiaceæ	59	22
75	103	39	Lauraceæ (See 101).	58 pp.	34
	104	4	Hernandiaceæ		
76	105	28	Papaveraceæ	191	24
77	106	208	Cruciferæ	190	172
78	107	1	Tovariaceæ	189	23
	108	34	Capparidaceæ		
79	109	6	Resedaceæ	188	6
80	110	1	Moringaceæ	146	1
81	111	3	Sarraceniaceæ	192	3
82	112	1	Nepenthaceæ	65	1
83	113	6	Droseraceæ	140	4
84	114	20	Podostemonaceæ	66	21
	115	1	Hydrostachyaceæ		
85	116	13	Crassulaceæ	141	14

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No. (reversed), Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
86	117	1	Cephalotaceæ (See 121)	142 pp.	73
	118	69	Saxifragaceæ		
87	119	10	Pittosporaceæ	183	9
	120	1	Brunelliaceæ (See 137, 139, 196)	161 pp.	30
	121	20	Cunoniaceæ (See 118)	142 pp.	
	122	1	Myrothamnaceæ (See 124)	139 pp.	
88	123	12	Bruniaceæ	138	10
89	124	10	Hamamelidaceæ (See 122)	139 pp.	15
90	125	1	Platanaceæ	47	1
	126	1	Crossosomataceæ (See 180, 278)	199 pp.	
91	127	91	Rosaceæ (See 181)	143 pp.	71
92	128	14	Connaraceæ	145	12
93	129	431	Leguminosæ	144	339
94	130	11	Geraniaceæ (See 153, 169)	163 pp.	20
	131	5	Oxalidaceæ		
	132	1	Tropæolaceæ		
95	133	9	Linaceæ (See 135)	167 pp.	14
96	134	3	Humiriaceæ	166	3
	135	2	Erythroxylaceæ (See 133)	167 pp.	
97	136	22	Zygophyllaceæ	164	17
	137	1	Cneoraceæ (See 120, 139, 196)	161 pp.	
98	138	111	Rutaceæ	162	83
99	139	28	Simarubaceæ (See 120, 137, 196)	161 pp.	
100	140	16	Burseraceæ	159	18
101	141	44	Meliaceæ	158	37
102	142	54	Malpighiaceæ	165	49
103	143	2	Trigoniaceæ	180, a.	
	144	5	Vochysiaceæ		
104	145	3	Tremandraceæ	182	3
105	146	10	Polygalaceæ	181	15
106	247	3	Dichapetalaceæ	157	3
107	148	221	Euphorbiaceæ (See 150)	50 pp.	197
	149	1	Callitrichaceæ (See 225)	137 pp.	9
	150	6	Buxaceæ (See 148)	50 pp.	
108	151	3	Empetraceæ	39	2
109	152	1	Coriariaceæ	147	1
	153	2	Limnanthaceæ (See 130, 169)	163 pp.	
110	154	59	Anacardiaceæ (See 157)	148 pp.	46
111	155	3	Cyrillaceæ	154, a.	3
112	156	1	Pentaphalaceæ (See 183, 186, 200)	173 pp,	
	157	1	Corynocarpaceæ (See 154)	148 pp.	
113	158	5	Aquifoliaceæ	155	3
114	159	38	Celastraceæ	154	39
	160	3	Hippocrateaceæ		

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No. (reversed), Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
115	161	2	Stackhousiaceæ	153	1
	162	6	Staphyleaceæ (See 164, 168)	150 pp.	
	163	38	Icacinaceæ (See 72)	156 pp.	
116	164	2	Aceraceæ (See 162, 168)	150 pp.	73
	165	2	Hippocastanaceæ		
	166	118	Sapindaceæ		
117	167	4	Sabiaceæ	149	4
	168	3	Melianthaceæ (See 162, 164)	150 pp.	
	169	2	Balsaminaceæ (See 130, 153)	163 pp.	
118	170	46	Rhamnaceæ	152	37
119	171	11	Vitaceæ	151	3
	172	7	Elæocarpaceæ (See 175)	168 pp.	
120	173	7	Chlænaceæ	171	4
	174		Gonystylaceæ (See 214)	56 pp.	
121	175	35	Tiliaceæ (See 172)	168 pp.	40
122	176	33	Malvaceæ	170	59
	177	20	Bombacaceæ		
123	178	48	Sterculiaceæ	169	41
	179??		Scytopetalaceæ		
124	180	13	Dilleniaceæ (See 126, 278)	199 pp.	17
	181	1	Eucryphiaceæ (See 127)	143 pp.	
125	182	17	Ochnaceæ	160	12
	183	2	Caryocaraceæ (See 112, 186, 200)	173 pp.	
	184	5	Marcgraviaceæ		
	185	2	Quiinaceæ (See 187)	174 pp.	
126	186	16	Theaceæ (See 183, 200)	173 pp.	32
127	187	42	Guttiferæ (See 185)	174	24
128	188	17	Dipterocarpaceæ (See 209)	172 pp.	12
129	189	2	Elatinaceæ	176	2
130	190	4	Frankeniaceæ	180	1
131	191	4	Tamaricaceæ	177	5
	192	1	Fouquieriaceæ		
132	193	4	Cistaceæ	187	4
133	194	4	Bixaceæ	184	29
	195	1	Cochlospermaceæ		
	196	1	Kœberliniaceæ (See 120, 137, 139)	161 pp.	
134	197	4	Canellaceæ	185	2
135	198	15	Violaceæ	186	21
	199	70	Flacourtiaceæ (See 194)	184 pp.	
	200	1	Stachyuraceæ (See 183, 186)	173 pp.	
136	201	6	Turneraceæ	128	3
137	202	1	Malesherbiaceæ	127	19
	203	18	Passifloraceæ		
	204	3	Achariaceæ		
	205	2	Caricaceæ		

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No. (reversed), Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
138	206	13	Loasaceæ	129	10
139	207	3	Datiscaceæ	124	3
140	208	4	Begoniaceæ	125	2
	209	1	Ancistrocladaceæ (See 188)	172 pp.	
141	210	20	Cactaceæ	123	13
142	211	1	Geissolomaceæ	55	4
	212	5	Penæaceæ		
	213	1	Oliniaceæ (See 216)	132 pp.	
143	214	37	Thymelæaceæ (See 174)	56 pp.	38
144	215	3	Elæagnaceæ	54	3
145	216	21	Lythraceæ (See 213)	132 pp.	30
	217	3	Sonneratiaceæ		
	218	1	Punicaceæ		
	219	18	Lecythidaceæ		
146	220	15	Rhizophoraceæ	136	17
147	221	15	Combretaceæ	135	15
148	222	72	Myrtaceæ	134	70
149	223	148	Melastomataceæ	133	134
150	224	37	Onagraceæ	131	22
151	225	8	Halorrhagidaceæ (See 149)	137 pp.	
	226		Cynomoriaceæ (See 74)	51 pp.	
152	227	51	Araliaceæ	120	38
153	228		Umbelliferæ	121	152
154	229		Cornaceæ	119	12
	230	1	Clethraceæ (See 233)	108 pp.	
	231	10	Pirolaceæ		
155	232	3	Lennoaceæ	104	3
156	233	67	Ericaceæ (See 230)	108 pp.	52
157	234	21	Epacridaceæ	106	26
158	235	6	Diapensiaceæ	105	6
159	236	23	Myrsinaceæ	101	23
160	237	28	Primulaceæ	102	21
161	238	9	Plumbaginaceæ	103	8
162	239	32	Sapotaceæ	100	24
163	240	7	Ebenaceæ	99	6
164	241	6	Styracaceæ	98	7
	242	1	Symplocaceæ		
165	243	20	Oleaceæ	97	18
166	244	3	Salvadoraceæ	96	3
167	245	32	Loganiaceæ	93	30
168	246	64	Gentianaceæ	92	49
169	247	130	Apocynaceæ	95	103
170	248	217	Asclepiadaceæ	94	145

Relative No., Engler & Prantl.	Serial No., Engler & Prantl.	Number of Genera in the family, according to Engler & Prantl.	Family Name, Engler & Prantl.	Serial No. (reversed), Bentham & Hooker.	Number of Genera in the family, according to Bentham & Hooker.
171	249	40	Convolvulaceæ (See 255)	88 pp.	32
172	250	8	Polemoniaceæ	91	8
173	251	17	Hydrophyllaceæ	90	16
174	252	85	Borraginaceæ	89	68
175	253	67	Verbenaceæ (See 268)	76 pp.	59
176	254	164	Labiatæ	75	136
	255	3	Nolanaceæ (See 249)	88 pp.	
177	256	75	Solanaceæ	87	66
178	257	179	Scrophulariaceæ	86	157
179	258	100	Bignoniaceæ	81	53
180	259	14	Pedaliaceæ	80	12
	260	3	Martyniaceæ		
181	261	12	Orobanchaceæ	85	11
182	262	84	Gesneriaceæ	82	71
183	263	1	Columelliaceæ	83	1
184	264	5	Lentibulariaceæ	84	4
185	265	3	Globulariaceæ	77	8
186	266	177	Acanthaceæ	79	120
187	267	5	Myoporaceæ	78	5
	268	1	Phrymaceæ (See 253)	76 pp.	
188	269	3	Plantaginaceæ	74	3
189	270	258	Rubiaceæ	117	337
190	271	12	Caprifoliaceæ	118	13
	272	1	Adoxaceæ		
191	273	8	Valerianaceæ	116	9
192	274	10	Dipsacaceæ	115	5
193	275	87	Cucurbitaceæ	126	68
194	276	59	Campanulaceæ	110	53
195	277	12	Goodeniaceæ	111	18
	278	3	Candolleaceæ (See 126, 180)	199 pp.	
196	279	3	Calyceraceæ	114	2
197	280	806	Compositæ	113	766

Total Number of Families, E. & P. 280
" " " B. & H. . . . . 200 Not counting
Total Number of Genera, E. & P. . . . . 8218 either postscript.
" " " B. & H. 7316

Upon motion of Mr. Kremers, duly seconded, the paper was received and ordered to take the usual course.

The Chairman: The paper is open for discussion, and I hope it will elicit some.

Dr. Eccles: The trouble is that a paper of this kind contains material that few of us have the mastery sufficiently to discuss it intelligently. Some papers are not worthy of discussion, and some, like this, are so far beyond our ability—cover a ground so unique—that we cannot discuss them with advantage, and I do not believe we can discuss this paper with any advantage. I know I cannot.

MR. LLOYD: This paper can be compared with the address of the Chairman. It is a contribution to be studied and thought about.

MR. KRAEMER: I desire to add my testimony to the work Dr. Rusby has been doing in this connection. It is the kind oi work that is necessary. All the work on pharmaceutical preparations is based on a knowledge of the plants that produce our drugs.

DR. LYONS: It so happens that there are two papers on allied subjects written entirely independently of one another—Dr. Rusby's and my own—and they so supplement one another that I should like to present in connection with Dr. Rusby's paper my own paper at this time. Without reading it in full, I should like to present the idea of it in brief.

Dr. Lyons then gave a brief outline of his treatment of his subject, and filed the following text of his paper on "The Scientific Synonymy of our Indigenous Plants."

THE SCIENTIFIC SYNONOMY OF OUR INDIGENOUS PLANTS.

BY A. B. LYONS.

A catalogue of the plants of North America north of Mexico has been recently published by A. A. Heller, of the University of Minnesota, comprising all known species of Phanerogams and Pteridophytes. The list is resonably complete, although a good many names have been overlooked in this first edition. The number of entries is 14,544. Each plant of this long list is entitled to as many names as there are languages spoken by the inhabitants of this extended territory. Fortunately, the language of the dominant race is likely soon to be the only one to be considered.

Every one, then, of the 15,000 plants native to this region is entitled to a vernacular English name. So little, however, are people generally interested in the weeds by the wayside, the wild flowers even, whose beauty wins momentary admiration, the individual plants making up the tangled undergrowth of glade and forest, to say nothing of grasses and sedges, bracken and water weeds, that hardly one plant in ten has really any need for a vernacular name. The limited number that come into definite relation with human wants will require some designation, and a name will be forthcoming with little regard for appropriateness. It may be descriptive, but the average mind is wonderfully deficient in originality, and nine times in ten it will be some already familiar plant name, belonging rightfully to a wholly different and often unrelated plant, to which it may or may not have some suggestion of resemblance. For example, a tree having a hard and durable wood may be called oak—probably with an added adjective, as prairie oak or water oak—although there may be no resemblance in leaf, flower or fruit to a true oak. In different localities, of course. different names will be applied to the same plant, while out of ignonorance or carelessness, or pure indolence, the same name will be used in different places to designate different plants.

Only the very few plants which are in such general use that they have become articles of merchandise, will have a vernacular name that is everywhere recognized, although even for these there will be many local synonyms that are regarded locally as the correct names of the plants in question. It is evident that popular plant nomenclature is and must be a chaos as long as the mass of the people are not practical botanists.

One prominent object sought by the men who first attempted to reduce botany to a science, was to do away with this confusion of language. There should be one common tongue, the Latin, and every species of plant should have its authorized and authoritative name, by which it should be known the world over. The system took form a century and a half ago. It was clear that there were many kinds of pines, maples, roses. Let us have a name for the group (genus), as Pinus, Acer, Rosa, corresponding with a man's surname, and then designate the particular kind, or species, by an added given name, which might well be descriptive. The plan is simple, and surely adequate to provide names for the few hundred thousand plants constituting the flora of the earth.

If such a scheme could have been carried into effect by a single giant intellect, having grasp at once of all the facts, the result would have been a perfect system of plant-names, good for all time. But, of necessity, the work had to be done piecemeal. Linné, who was the first to grapple with the task, and who also brought to it an equipment of knowledge and of insight that was simply marvelous, did the work of a score of men. Recognizing the limitations of his knowledge, he yet, by his temporary adoption of an artificial system of classification, escaped in large measure the hampering effect of those limitations in the stupendous work he had undertaken.

If there could have been appointed at that time a Commission on Botanical Nomenclature, to which should be communicated every new name proposed, together with an authentic specimen of the plant to which it was to be applied, and this Commission could have been perpetuated through all the succeeding generations, provided with an universal herbarium for reference, and a complete botanical library, it would have been possible to maintain perfect uniformity in the scientific nomenclature of plants. In absence of such co-operation of effort, which seems even to-day to be a goal yet distant, independent investigators have duplicated one the work of another. Inter-communication between them, until within recent years, was difficult. Few had means to do more than pursue, in the intervals of their remunerative work, the study they loved. The majority had not opportunity to study the herbaria of other collectors. Published descriptions were often meagre and insufficient, so that they might easily be thought to apply to a species quite different from that on which the description was based. Some botanists took large liberties in correcting names which their predecessors had given. So it happened that for about 200,000 species of plants there have been recorded not fewer than 700,000 names.* Some species rejoice in a dozen, even a score, of botanical synonyms, while not unfrequently the same name has been given to two or more different species.

Such a state of things was a reproach to science. To botanists themselves it became so intolerable, that, at the Botanical Congress, held at Paris, in 1867, concerted action was taken to remedy it. All names but one must be disavowed. Clearly, that to be retained should be always that first applied to the plant, provided it had not been previously applied to some other plant. Guided by this single principle, botanists have gone to work in earnest to reconstruct the nomenclature of their science. It has been by no means an easy task. Original records must be sought out, collated, and interpreted by the aid of original type specimens, when these could be found. The work has been prosecuted with especial zeal by American botanists; the necessary laborious researches have been practically completed, and we are in possession of the results of this labor in the form of a list of plant-names which are henceforward to be universally accepted. Such a list is that of Prof. Heller, of which I have already spoken. In this list, however, hardly any synonyms are given. It is desirable that the synonyms should pass out of mind. They are of interest, however, to two classes, first, to botanists who have occasion to name new species—the new name would be invalid if it had ever been used before—second, to those of us who are only amateur botanists, and who have taken our nomenclature from such authorities as Gray's Manual, Chapman's Flora, Gray's Synoptical Flora, etc.—until recently the best works available to the ordinary student.

A new botanical work has just been published, however, the most ambitious yet produced in America, which puts us in possession of synonyms as well as results, so far as relates to the plants of the Northern United States. I refer, of course, to Britton and Brown's Illustrated Flora, published in three volumes, by Charles Scribner's Sons. This magnificent work contains descriptions of 4162 species of plants, phanerogams and pteridophytes, each one not only described, but also figured, and synonymy with dates fully given.

It has been a matter of surprise to me to find that so large a proportion of the names that were accepted twenty-five years ago have given place in this work, which may be regarded as a final authority in most cases on nomenclature, to unfamiliar ones. I believe that fully twenty-five per cent. of the names adopted in these volumes are in this sense new. The changes arise partly from sub-divisions of genera—rather, I should say, from recognition by the editors of the validity of genera which have been known to us heretofore only as sub-genera—partly they have come from reinstating old generic names that have been forgotten, but most commonly they result from restoring the original specific names. Under the new rules, the first name applied to a species must remain its specific name, and credit must be given to the author of this name. It has often happened in the past that an inappropriate name has been discarded in favor of a better one. If a plant indigenous to the Southern States had been named Canadensis, the obvious mistake was corrected, and the name changed perhaps to Caroliniana, the name of the botanist making the change appearing now as authority, while that of the older botanist disappeared.

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* Introduction to Britton and Brown's Illustrated Flora of the Northern United States, p. 8.

The new rules require that the oldest name be restored, even though inappropriate, so that we shall have a permanent record of the earliest recognition by science, (if not before 1753) of the species in question. There is probably historical significance also in the very blunders thus perpetuated.

The nature of the changes may be illustrated by a few examples. Until within a dozen years botanists generally in this country have called the white pond-lilies Nymphæa, the yellow pond-lilies Nuphar, and the lotus lilies Nelumbium. We find in the present publication the first of these called Castalia, the second Nymphæa, the last being Nelumbo. The justification of these seemingly arbitrary—certainly very confusing—changes is as follows: Water-lilies were at first all included in the Linnæan genus Nymphæa. Adanson in 1763 recognized the lotus lilies as a distinct genus, to which he gave the name Nelumbo. In 1805 Salisbury separated the white pond-lilies, referring them to a new genus, Castalia. The succeeding year, Solander treated the yellow pond-lilies in a similar manner, naming the new genus Nuphar, ignorant of the fact that nothing now remained of the genus Nymphæa except the yellow pond-lilies. Solander's name must therefore be rejected as unnecessary.

The name Nelumbo had been originally used by Linné as the specific name of the Indian lotus. It was in fact the vernacular Ceylonese name of the plant. When the specific name had been appropriated by Adanson as that of the genus, it was thought necessary to give the plant a new specific name. Gærtner, in 1788, called it Nelumbo nucifera. Willdenow, eleven years later, probably in ignorance of Gærtner's name, called it Nelumbium speciosum, latinizing the generic name, and so the plant has been generally known to botanists until the adoption of the rigid rule of priority. Under this the name becomes Nelumbo Nelumbo (L.) Karst., which means that Linné gave the plant its specific name, while Karstens first united this with the new generic name of Adanson. I confess to a dislike of these reduplicated names, but anything for peace and stability.

After all, it is not the reduplication I object to so much—that in the Greek or Hawaiian is musical enough—but really I do not know why it is necessary to immortalize the Karstens, who did nothing but apply a rule. It is this feature of double crediting that I quarrel with in the new nomenclature. It seems to me that a second credit is due only to one who has established a new genus, or who has transferred a plant that has been misplaced to its rightful genus. It is bad enough to have to remember who first named a plant, although that is knowledge of some interest; but to have to carry in mind also the name of a man who had really nothing to do except clerically with the naming of the plant is a supererogatory work, minus the merit.

It has seemed to me that I might do a real service to fellow amateurs in botany by giving in parallel columns the names, on the one hand, which were current among botanists ten, twenty, even thirty years ago; and, on the other, their synonyms as given in the new flora of Britton and Brown. I have omitted from the list only the grasses, sedges and rushes. I have placed on the left hand the names that have been until recently current—the majority of them those still in common use among botanical students and collectors. Many of them hold their places still in the latest editions of the Floras of Gray, Chapman and Coulter, although the names now accepted as authoritative are gradually displacing them, and we may expect that before many years the text-books used in high schools and colleges will be quite up to date in their nomenclature.

The names in the right hand column are those adopted by Britton and Brown. In a few instances these differ from those given in Heller's list. Such differences are indicated in most cases, in foot-notes. Dates are appended when they explain and justify the alterations. It has not seemed to me necessary to insert dates except when changes depended on priority.

The authorities appended in the left hand column are generally those given in Gray's Manual and other text-books and catalogues that have been in use until recently. In many cases these authorities are erroneously cited, at least according to present usage. Sometimes a name has been attributed to a botanist who gave the name in fact to another plant. In such cases I have generally given a correct citation of authority, adding in brackets a negative as to the author incorrectly cited. Thus the plant which botanists have known as Lechea major, Lin., is not that to which Linné gave the name in 1753. Michaux, in 1803, called it by that name through error, taking it for the Linnean species. Accordingly I write not "Lechea major, L.," but "Lechea major, Michx., 1803 [not L., 1753]. Brackets again are used where I have inserted an *original* authority with date. Thus the plant formerly known as Desmodium acuminatum, DC., received its specific name, not from DeCandolle, but from Michaux, the species having been named grandiflora by Walter fifteen years earlier. I have tried to make this clear by writing "Desmodium acuminatum [Michx., 1803.] DC."

Again, brackets are sometimes used in giving authority and date for a generic name. In the names on the right, I have followed the capitalization and punctuation of Britton and Brown, the abbreviation var. for variety being invariably omitted, and all substantive words and adjectives derived from proper names being capitalized. In the left hand column I have adopted the same punctuation and capitalization, but have retained the familiar abbreviation var.

Finally, I have followed in this list the same arrangement of families and genera as that adopted by the authors of the new Illustrated Flora, since this represents the conclusions reached in the most recent studies on the relationships of families.

OPHIOGLOSSACEÆ.

Current Names.	*Corrected Names.*
Ophioglossum vulgatum Eaton [not L.].	Ophioglossum Engelmanni Prantl.
Botrychium Virginicum Swz.	B. Virginianum (L.) Swz.
B. lunarioides Swz.	B. ternatum (Thunb.) Swz.*
B. ternatum var. dissectum Eaton.	B. dissectum Spreng.
POLYPODIACEÆ.	(*Filices in part.*)
Struthiopteris Germanica Willd.	Onoclea Struthiopteris (L.) Hoffm.
Aspidium, Swz., 1800.	Dryopteris Adanson, 1763.
A. Lonchitis Swz.	D. Lonchitis (L.) Kze.
A. acrostichoides Swz.	D. acrostichoides (Mx.) Kze.
A. aculeatum Swz. var. Braunii. Koch.	D. Braunii (Spenner) Underw.
A. Noveboracense Willd.	D. Noveboracensis (L.) A. Gray.
A. Thelypteris Swz.	D. Thelypteris (L.) A. Gray.
A. fragrans Swz.	D. fragrans (L.) Schott.
A. cristatum Swz.	D. cristata (L.) A. Gray.
A. Goldianum Hook.	D. Goldieana (Hook.) A. Gray.
A. marginale Swz.	D. marginalis (L.) A. Gray.
A. Filix-mas Swz.	D. Filix-mas (L.) Schott.
A. spinulosum Swz.	D. spinulosa (Retz.) Kze.
A. spinulosum var. Boottii A. Gray.	D. Boottii (Tuckerm.) Underw.
Polypodium Phegopteris L.	Phegopteris Phegopteris (L.) Underw.
P. hexagonopterum Michx.	P. hexagonoptera (Mx.) Fée.
Polypodium Dryopteris Lin.	Phegopteris Dryopteris (L.) Fée.
Woodwardia angustifolia Sm., 1793.	Woodwardia areolata (L., 1753.) Moore.
Scolopendrium officinarum Sw., Or S. vulgare Sm., 1793.	Scolopendrium Scolopendrium † (L., 1753.) Karst.
Asplenium ebeneum Ait., 1789.	Asplenium platyneuron (L., 1753.) Oakes.
A. thelypteroides Michx., 1803.	A. acrostichoides Swz., 1800.
Allosorus acrostichoides Spreng.	Cryptogramma acrostichoides R. Br.
A. gracilis [Mx., 1803.] Presl.	Pellæa Stelleri (J. G. Gmel., 1768.) Watt.

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* According to Underwood, this species is not found in America but is represented by B. dissectum, Spreng., and B. obliquum, Willd., which are regarded by Britton and Brown as varieties of B. ternatum. (Thunb.) Swz.

† In Keller's catalogue this is Phyllitis Scolopendrium (L.) Greene.

Current Names.	*Corrected Names.*
A. atropurpureus A. Gray.	P. atropurpurea (L.) Link.
Cheilanthes vestita [Swz., 1806.] Willd.	Cheilanthes lanosa (Mx., 1803.) Watt.
Polypodium incanum Swz., 1806.	Polypodium polypodioides (L., 1753. A. S. Hitchcock.
EQUISETACEÆ.	
Equisetum limosum L., 1753.	Equisetum fluviatile L., 1753.
LYCOPODIACEÆ.	
Lycopodium dendroideum Mx., 1803.	Lycopodium obscurum L., 1753.
PINACEÆ. (*Coniferæ in part.*)	
Pinus australis Mx., 1810.	Pinus palustris Mill., 1768.
P. Banksiana Lambert, 1803.	P. divaricata (Ait., 1789.) Sudw.
P. inops Ait., 1789.	P. Virginiana Mill., 1768.
P. mitis Michx., 1803.	P. echinata Mill., 1768.
Larix Americana Mx., 1803.	Larix laricina (Du Roi, 1771.) Koch.
Abies alba [Ait., 1789.] Mx. [Not Mill., 1768.]	Picea Canadensis (Mill., 1768.) B. S. P.
A. nigra [Ait., 1789.] Poir.	P. Mariana (Mill., 1768.) B. S. P.
A. nigra, var. rubra Engelm.	P. rubra (Lamb.) Link.
A. Canadensis Mx.	Tsuga [Carr., 1855] Canadensis (L.) Carr.
A. Caroliniana Chapm.	T. Caroliniana Engelm.
Cupressus thyoides L.	Chamæcyparis [Spach., 1842] thyoides (L.) B. S. P.
Juniperus communis var. alpina Gaud., 1830.	Juniperus nana Willd., 1806.
J. Virginiana var. humilis Hook.	J. Sabina L.
TAXACEÆ (*Coniferæ in part*).	
Taxus baccata var. Canadensis [Willd., 1806.] A. Gray.	Taxus minor (Mx., 1803.) Britton.
SPARGANIACEÆ.	
Sparganium simplex var. androcladum Engelm.	Sparganium androcladum (Engelm.) Morong.
S. angustifolium Mx.	S. simplex angustifolium (Mx.) Engelm.
NAIADACEÆ.	
Potamogeton Claytonii Tuck., 1843.	Potamogeton Nuttallii Cham. & Sch., 1827.
P. rufescens Schrad., 1815.	P. alpinus Balbis, 1804.
P. gramineus, L. var. heterophyllus Fries.	P. heterophyllus Schreb.
P. gramineus var. spathulæformis Robbins.	P. spathulæformis (Robbins.) Morong.
P. Tuckermanni Robbins, 1856.	P. confervoides Reichb., 1845.
P. compressus Fries, 1828. [Not L., 1753.]	P. zosteræfolius Schum., 1801.
P. pauciflorus Pursh, 1814. [Not Lam., 1789.]	P. foliosus Raf., 1808.
P. pusillus, var. major Fries, 1845. [Not M. & K., 1823.]	P. Friesii Ruprecht, 1845.
P. pusillus var. gemniparus Robbins.	P. gemmiparus (Robbins). Morong.
P. hybridus Mx., 1803. [Not Thuill., 1790.]	P. diversifolius Raf., 1808.
Naias major All., 1785.	Naias marina L., 1753.
N. Indica var. gracillima Braun.	N. gracillima (A. Br.) Morong.

Current Names.	*Corrected Names.*
SCHEUCHZERIACEÆ (*Naidaceæ in part.*)	
Triglochin maritimum var. elatum A. Gray.	Triglochin maritima. L.
ALISMACEÆ.	
Alisma Plantago var. Americanum A. Gray.	Alisma Plantago-aquatica L.
Echinodorus parvulus Engelm., 1856.	A. tenellum Mart., 1830.
E. rostratus Engelm., 1856.	Echinodorus cordifolius (L., 1753.) Griseb.
Sagittaria calycina Engelm.	Lophotocarpus [T. Durand, 1888] calycinus (Engelm.) J. G. Sm.
S. pusilla Nutt., 1818.	Sagittaria sublata (L., 1753.) Buchanan.
S. heterophylla Pursh, 1814. [Not Schreb., 1811.]	S. rigida Pursh, 1814.
S. variabilis Engelm., 1848.	S. latifolia Willd., 1806.
VALLISNERIACEÆ.	
Anacharis Canadensis Planch. Or Elodea [Michx., 1803. Not, Elodes, Adanson, 1763.] Canadensis. Mx.	Philotria [Raf., 1818.] Canadensis (Mx.) Brit.
ARACEÆ.	
Xanthosoma sagittæfolia Chapin.	Peltandra sagittæfolia (Mx.) Morong.
Symplocarpus [Salisb., 1818] fœtidus Salisb.	Spathyema [Raf., 1808] fœtida (L.) Raf.
LEMNACEÆ.	
Lemna polyrrhiza L.	Spirodela polyrhiza (L.) Schleid.
Wolffia Floridana J. D. Smith.	Wolffiella Floridana (J. D. Smith.) Thomps.
XYRIDACEÆ.	
Xyris bulbosus Kunth.	X. flexuosa Muhl., 1813.
X. flexuosa var. pusilla A. Gray, 1867. [Not X. pusilla R. Br., 1810.]	X. montana H. Ries, 1892.
ERIOCAULACEÆ.	
Eriocaulon gnaphalodes Mx., 1803.	Eriocaulon compressum Lam., 1789.
Pæpalanthus [Mart., 1830] floridus Kunth.	Dupayta [Vell., 1825] flavidula (Mx.) Kze.
Lachnocaulon Michauxii Kunth., 1841.	Lachnocaulon anceps (Walt., 1788.) Morong.
COMMELINACEÆ.	
Commelina agraria Kunth., 1843.	Commelina nudiflora L., 1753.
C. erecta A. Gray, 1856. [Not L. 1753.]	C. hirtella Vahl., 1806.
Tradescantia Virginica Gray.	Tradescantia Virginiana L.
T. Virginica var. villosa S. Wats., 1890.	T. brevicaulis Raf., 1832.
PONTEDERIACEÆ.	
Schollera [Schreb., 1789; not Roth, 1788] graminea [Mx., 1803.] Willd.	Heteranthera [R. and P., 1794] dubia. Jacq., 1768.
MELANTHACEÆ.	
Tofieldia pubescens [Mx., 1803.] Ait.	Tofieldia racemosa (Walt., 1788.) B. S. P.
Narthecium* [Juss., 1789] Americanum Ker.	Abama [Adanson, 1763] Americana. (Ker.) Morong.
Amianthium [A. Gray, 1837] muscætoxicum Gray.	Chrosperma muscætoxicum (Walt.) Kze.

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* This genus has been referred heretofore to Juncaceæ.

Current Names.	*Corrected Names.*
Stenanthium angustifolium [Pursh, 1814.] A. Gray.	Stenanthium gramineum (Ker., 1813.) Morong.
Zygadenus glaucus Nutt., 1818.	Zygadenus elegans Pursh, 1814.
Veratrum parviflorum Mx.	Melanthium parviflorum (Mx.) S. Wats.
LILIACEÆ.	
Allium striatum Jacq., 1796.	Nothoscordum [Kunth., 1843] bivalve (L., 1753.) Britton.
Lilium superbum, var. Carolinianum Chapm.	Lilium Carolinianum Michx.
Camassia, Lindley, 1832.	Quamasia, Raf., 1818.
Scilla Fraseri Gray, 1856.	Quamasia hyacintha (Raf., 1836.)† Brit.
CONVALLARIACEÆ. (*Liliaceæ in part.*)	
Clintonia umbellata Torr.	Clintonia umbellulata. (Michx.) Torr.
Smilacina, Desf, 1807.	Vagnera, Adanson, 1763.
S. racemosa Desf.	V. racemosa (L.) Morong.
S. stellata Desf.	V. stellata (L.) Morong.
S. trifolia Desf.	V. trifolia (L.) Morong.
Maianthemum, Wigg., 1780.	Unifolium, Adanson, 1763.
M. bifolium. Desf. (?) Or, Smilacina bifolia, var. Canadensis, A. Gray.	U. Canadense (Desf.) Greene.
Prosartes, Don., 1840.	Disporum, Salisbury, 1812.
P. lanuginosa Don.	D. lanuginosum (Mx.) Nichols.
P. trachycarpa S. Wats.	D. trachycarpum (S. Wats.) B. & H.
Polygonatum giganteum Dietr., 1835.	Pologonatum commutatum (R. & S., 1830.) Dietr.
Trillium erythrocarpum Mx., 1803.	Trillium undulatum Willd., 1801.
SMILACEÆ.	
Smilax tamnoides A. Gray, 1848. [Not L.]	Smilax Bona-nox L., 1753.
HÆMODORACEÆ.	
Lachnanthes, Elliot, 1816.	Gyrotheca, Salisbury, 1812.
L. tinctoria [Salisb., 1812.] Ell.	G. capitata (Walt., 1788.) Morong.
AMARYLLIDACEÆ.	
Amaryllis Atamasco L.	Zephyranthes [Herb., 1821.] Atamasco (L.) Herb.
Pancratium occidentale Leconte.	Hymenocallis [Salisb., 1812.] occidentalis (Leconte.) Kunth.
Hypoxis erecta L., 1759.	Hypoxis hirsuta (L., 1753.) Coville.
Lophiola aurea Ker., 1814.	Lophiola Americana (Pursh, 1814.) Coville.
IRIDACEÆ.	
Iris Virginica Muhl., 1813. [Not L., 1753.]	Iris prismatica Pursh, 1814.
Iris cuprea Pursh., 1814.	Iris fulva Ker., 1812.
Sisyrinchium anceps S. Wats., 1890. [Not Cav., 1788.]	Sisyrinchium graminoides Bicknell, 1896.
S. (Formerly confounded with the following.)	S. Atlanticum Bicknell, 1896.
S. Bermudianum var. mucronatum [Michx., 1803.] A. Gray.	S. angustifolium Mill., 1759.

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† Heller's catalogue gives this as Quamasia esculenta (Ker.) Coville.

Current Names.	*Corrected Names.*
ORCHIDACEÆ.	
Cypripedium spectabile [Salisb., 1791.] Swz.	Cypripedium reginæ Walt., 1788.
C. pubescens Willd., 1805.	C. hirsutum Mill., 1768.
Platanthera * rotundifolia Lindl.	Orchis rotundifolia Pursh.
Platanthera Hookeri Lindl.	Habenaria Hookeriana A. Gray, 1836.
Gymnadenia nivea Gr. & Engelm.	H. nivea (Nutt.) Spreng.
G. tridentata [Willd., 1805.] Lindl.	H. clavellata (Mx., 1803.) Spreng.
G. flava Lindl.	H. flava (L.) A. Gray.
Platanthera fimbriata Lindl. [Willd., 1805, not Dryand, 1789.]	H. grandiflora (Bigel., 1824.) Torr.
Pogonia pendula Lindl., 1825.	Pogonia trianthophora (Swz., 1800.) B. S. P.
Epipactis Helleborine A. Gray, 1890. [Not Crantz, 1769.]	Epipactis viridiflora (Hoffm., 1804.) Reichb.
Spiranthes, L. C. Richard, 1818.	Gyrostachys, Persoon, 1870.
S. latifolia Torr., 1886.	G. plantaginea (Raf., 1818.) Britton.
S. cernua Richard.	G. cernua (L.) Kze.
S. odorata Nutt.	G. odorata (Nutt.) Kze.
S. graminea var. Walteri A. Gray, 1867.	G. præcox (Walt., 1788.) Kze.
S. simplex A. Gray.	G. simplex (A. Gray.) Kze.
S. gracilis Bigel.	G. gracilis (Bigel.) Kze.
Goodyera, R. Br., 1813.	Peramium, Salisbury, 1812.
G. Menziesii Lindl.	P. Menziesii (Lindl.) Morong.
G. repens R. Br.	P. repens (L.) Salisb.
G. pubescens R. Br.	P. pubescens (Willd.) MacM.
Microstylis, Nutt., 1818.	Achroanthes, Raf., 1808.
M. monophyllos Lindl.	A. monophylla (L.) Greene.
M. ophioglossoides Nutt., 1818.	A. unifolia (Mx., 1803.) Raf.
Liparis, L. C. Richard, 1818.	Leptorchis, Thouars, 1808.
L. liliifolia Richard.	L. liliifolia (L.) Kze.
L. Lœselii Richard.	L. Lœselii (L.) MacM.
Calypso borealis Salisb., 1807.	Calypso bulbosa (L., 1753.) Oakes.
Corallorhiza innata R. Br., 1813.	Corallorhiza Corallorhiza (L., 1753.) Karst.
C. Macræi A. Gray, 1856.	C. striata Lindl., 1840.
Tipularia discolor Nutt., 1818.	Tipularia unifolia (Muhl., 1813.) B. S. P.
Calopogon, R. Br., 1813.	Limodorum, L., 1753.
C. pulchellus [Willd., 1805.] R. Br.	L. tuberosum L., 1753.
Bletia aphylla Nutt.	Hexalectris [Raf., 1825.] aphyllus (Nutt.) Raf.
Aplectrum hyemale [Willd., 1805.] Nutt.	Aplectrum spicatum (Walt., 1788.) B. S. P.
JUGLANDACEÆ.	
Carya, Nutt., 1818.	Hicoria, Raf., 1808.
C. olivæformis Nutt., 1818.	H. Pecan (Marsh., 1785.) Britton.
C. amara Nutt., 1818.	H. minima (Marsh., 1785.) Britton.
C. alba Nutt., 1818. (Not Juglans alba. L.).	H. ovata (Mill., 1768.) Britton.
C. sulcata Nutt., 1818. [Not Juglans sulcata Willd., 1796].	H. laciniosa (Michx. f., 1810.) Sarg.
C. tomentosa [Lam., 1797.] Nutt.	H. alba (L., 1753.) Britton.
Hicoria glabra var. villosa Sarg., 1895. And H. pallida Ashe, 1896. (In part.)	H. villosa (Sarg.) Ashe.

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* The other species of Platanthera are now all referred to Habenaria.

Current Names.	*Corrected Names.*
MYRICACEÆ.	
Comptonia asplenifolia [L., 1753.] Ait.	Comptonia peregrina (L., 1753.) Coulter.
SALICACEÆ.	
Populus monilifera Ait., 1789. And P. angulata Ait., 1789.	Populus deltoides Marsh., 1785.
Salix nigra var. amygdaloides Anders.	Salix amygdaloides Anders.
S. longifolia Muhl., 1803. [Not Lam., 1778.]	S. fluviatilis Nutt., 1842.
S. rostrata Rich., 1823. [Not Thuill., 1799.] Or S. livida var. occidentalis Gray.	S. Bebbiana Sarg., 1895.
S. eriocephala Michx.	Included in S. discolor Muhl.
BETULACEÆ.	
Carpinus Americana Mx.	Carpinus Caroliniana Walt., 1788.
Ostrya Virginica Willd., 1805.	Ostrya Virginiana (Mill., 1768.) Willd.
Betula alba var. populifolia Spach.	Betula populifolia Marsh.
B. papyracea [Willd., 1805.] Ait.	B. papyrifera Marsh., 1785.
B. excelsa Ait.	B. lutea Michx. f., 1812.
Alnus viridis [Chaix., 1789.] DC.	Alnus alnobetula [Erhr., 1788.) K. Koch.
A. serrulata [Willd., 1805.] Ait.	A. rugosa (DuRoi, 1771.) K. Koch.
FAGACEÆ. (*Cupuliferæ.*)	
Fagus ferruginea Ait., 1789.	Fagus Americana [Muench, 1770.] Sweet.
Castanea vesca var. Americana Mx., 1803.	Castanea dentata [Marsh, 1785.] Borkh.
Quercus tinctoria Bartram, 1791.	Quercus velutina Lam., 1783.
Q. falcata Mx., 1801.	Q. digitata (Marsh, 1785.) Sudw.
Q. ilicifolia Wang., 1787.	Q. nana (Marsh, 1785.) Sarg.
Q. nigra L., var. b., 1753.	Q. Marylandica Muench, 1770.
Q. aquatica [Lam., 1783.] Catesby.	Q. nigra L., 1753.
Q. obtusiloba Mx., 1801.	Q. minor (Marsh, 1785.) Sarg.
Q. virens Ait., 1789.	Q. Virginiana Mill., 1768.
Q. prinos var. discolor A. Gray, and Q. bicolor Willd., 1801.	Q. platanoides (Lam., 1783.) Sudw.
Q. castanea Willd.	Q. acuminata (Mx., 1801.) Sarg.
ULMACEÆ. (*Urticaceæ in part.*)	
Ulmus fulva Mx., 1803.	Ulmus pubescens Walt., 1788?*
MORACEÆ. (*Urticaceæ in part.*)	
Maclura, Nutt., 1818.	Toxylon, Raf., 1817.
M. aurantiaca Nutt., 1818.	T. pomiferum Raf., 1817.
URTICACEÆ.	
Urtica purpurascens Nutt.	Urtica chamædryoides Pursh, 1814.
Laportea, Gaud., 1826.	Urticastrum, Fabr., 1759.
L. Canadensis Gaud., 1826.	U. divaricatum (L., 1753.) Kze.
Pilea, Lindl., 1821.	Adicea, Raf., 1815.
P. pumila A. Gray.	A. pumila (L.) Raf.
LORANTHACEÆ.	
Arceuthobium, Bieb., 1819.	Razoumofskya, Hoffm., 1808.
A. pusillum Peck.	R. pusilla (Peck.) Kze.

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* Britton and Brown retain U. fulva, Heller's catalogue gives U. pubescens.

Current Names.	*Corrected Names.*
SANTALACEÆ.	
Pyrularia oleifera [Muhl., 1805.] A. Gray.	Pyrularia pubera Michx., 1803.
Darbya [A. Gr., 1846.] umbellulata A. Gray.	Nestronia [Raf., 1836.] Umbellula Raf.
ARISTOLOCHIACEÆ.	
Aristolochia Sipho L'Her., 1784.	Aristolochia macrophylla Lam., 1783.
Asarum Canadense var. acuminatum Ashe.	Asarum acuminatum (Ashe.) Bicknell.
POLYGONACEÆ.	
Eriogonum sericeum Torr., 1870. [Not Pursh, 1814.]	Eriogonum Jamesii Benth., 1856.
E. gnaphalioides Benth., 1853.	E. multiceps Nees, 1841.
E. sericeum Pursh, 1814.	E. flavum Nutt., 1813.
Koenigia, L., 1767. (Not Konig, Adans., 1763.)	Macounastrum Small.
K. Islandica L.	M. Islandicum (L.) Small.
Rumex Hydrolapathum var.? Americanum A. Gray, 1856, and R. orbiculatus A. Gray, 1867.	Rumex Britannica L., 1753.
Fagopyrum esculentum Moench, 1794.	Fagopyrum Fagopyrum (L., 1753.) Karst.
Polygonum aviculare var. littorale Link., and P. maritimum Auct.	Polygonum littorale Link.
P. aviculare var. erectum Roth.	P. erectum L.
P. articulatum L.	Polygonella articulata (L.) Meisn.
CHENOPODIACEÆ.	
Chenopodium ambrosioides var. anthelminticum A. Gray.	Chenopodium anthelminticum L.
Obione arenaria Moquin.	Atriplex arenaria Nutt.
Chenopodina maritima Moquin.	Dondia maritima (L.) Druce.
Cycloloma platyphyllum Moquin., 1840.	Cycloloma atriplicifolium (Spreng., 1801.) Coulter.
Atriplex patulum var. hastatum A. Gray.	Atriplex hastata L.
Salicornia micronata Bigel., 1824. [Not Lag., 1817.] And S. Virginica Moquin, 1849. [Not L., 1753.]	Salicornia Bigelovii Torr., 1859.
S. fruticosa var. ambigua A. Gray.	S. ambigua Mx.
Suæda, Forsk., 1775.	Dondia, Adanson, 1763.
S. maritima Dumortier.	D. maritima (L.) Druce.
S. linearis var. ramosa S. Wats., 1874.	D. Americana (Pers., 1805.) Britton.
S. depressa S. Wats.	D. depressa (Pursh) Britton.
AMARANTACEÆ.	
Amaranthus chlorostachys. Willd.	Included in Amaranthus hybridus. L.
A. albus L., 1763.	A. græcizans L., 1753.
Montelia Tamariscina A. Gray.	Acnida [L., 1753.] Tamariscina (Nutt.) Wood.
Irisine celosioides L., 1763.	Irisine paniculata (L.) K e.
NYCTAGINACEÆ.	
Oxybaphus, L'Her., 1779.	Allionia, Lœfl., 1758.
O. angustifolius Sweet, 1813. (Name only.)	A. linearis Pursh, 1814.

Current Names.	*Corrected Names.*
O. nyctagineus Sweet.	A. nyctaginea Michx.
O. nyctagineus var. oblongifolius Torr., 1859.	A. nyctaginea ovata (Pursh, 1814.) Morong.
O. albidus Sweet.	A. albida Walt.
O. hirsutus Choisy.	A. hirsuta Pursh.
O. Bodini Holzinger	A. Bodini (Holzinger.) Morong.
AIZOACEÆ.	
Sesuvium pentandrum Ell., 1821. And S. Portulacastrum A. Gray.	Sesuvium maritimum Walt., 1788.) B. S. P.
CARYOPHYLLACEÆ.	
Lychnis Githago Scop.	Agrostemma Githago L.
Silene nivea DC., 1824.	Silene alba Muhl., 1813.
S. inflata Sm., 1800.	S. vulgaris (Moench, 1794.) Garcke.
S. Pennsylvanica Mx., 1803.	S. Caroliniana Walt., 1788
S. nocturna Auct. [Not L.]	S. Anglica L., 1753.
Lychnis vespertina Sibth., 1794.	Lychnis alba Mill., 1768.
Stellaria, L., 1753, Pl., 421.	Alsine, L., 1753, Pl., 274.
S. humifusa Rottb.	A. humifusa (Rottb.) Britton.
S. uliginosa Murr.	A. uliginosa (Murr.) Britton.
S. media Sm.	A. media L.
S. pubera Mx.	A. pubera. (Mx.) Britton.
S. Holostea L.	A. Holostea (L.) Britton.
S. longifolia Muhl.	A. longifolia (Muhl.) Britton.
S. graminea L.	A. graminea (L.) Britton.
S. longipes Goldie.	A. longipes (Goldie.) Coville.
S. crassifolia Erhr.	A. crassifolia (Erhr.) Britton.
S. borealis Bigel.	A. borealis (Bigel.) Britton.
Sagina fontinalis Short & Peter.	A. fontinalis (Short & Peter.) Britton.
Cerastium vulgatum Auct. [Not L.] Or C. glomeratum Thuill.	Cerastium viscosum L.
C. viscosum* Auct. [Not L.] And C. triviale Link.	C. vulgatum L.
C. vulgatum var. semidecandrum A. Gray.	C. semidecandrum L.
C. nutans Raf., 1814.	C. longipedunculatum Muhl., 1813.
C. nutans var. brachypodum Engelm.	C. brachypodum (Engelm.) Robinson.
C. quaternellum Fenz., 1833.	Mœnchia [Erhr., 1788.] erecta. (L. 1753.) Gærtn.
Sagina subulata Wimmer. [Not Presl., 1826.]	Sagina decumbens (Ell., 1817.) T. & G.
Arenaria squarrosa Mx., 1803.	Arenaria Caroliniana Walt., 1788.
A. lateriflora L.	Mœhringia [L. 1753] lateriflora (L.) Fenz.
Honkenya, Erhr., 1788.	Ammodenia, S. G. Gmel., 1769.
H. peploides Erhr. Or Arenaria peploides. L.	A. peploides (L.) Ruprecht.
Arenaria stricta var. Texana Robinson.	Arenaria Texana (Robinson). Britton.
A. Pitcheri Nutt.	Included in A. patula Mx.
Spergularia, Pers., 1805.	Tissa, Adanson, 1763.

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* The plant is so labeled in the Linnæan herbarium. Hence the confounding of this with the preceding species.

Current Names.	*Corrected Names.*
S. media A. Gray, 1867. And S. salina Presl., 1819.	T. marina (L., 1753.) Britton.
S. rubra Presl.	T. rubra (L.) Britton.
Tissa salina Brit., 1889. [Not spergularia salina Presl., 1819.]	T. Canadensis (Pers., 1805.) Britton.
Anychia dichotoma var. capillacea Torr., 1824.	Anychia Canadensis (L., 1753.) B. S. P.
NYMPHÆACEÆ.	
Brasenia peltata Pursh, 1814.	Brasenia purpurea (Mx., 1803.) Casp.
Nuphar, Stbth. & Sm., 1806.	Nymphæa, L., 1753.
N. advena Ait.	N. advena Solander.
N. rubrodiscum Morong.	N. rubrodisca (Morong.) Greene.
N. luteum var. pumilum Hoppe.	N. Kalmiana (Mx., 1803.) Sims.
N. sagittæfolia Pursh.	N. sagittæfolia Walt.
Nymphæa, L., in part.	Castalia, Salisb., 1805.
N. odorata Ait.	C. odorata (Dryand.) Woodv. & Wood.
N. tuberosa Paine.	C. tuberosa (Paine.) Greene.
Nelumbium luteum Willd.	Nelumbo lutea (Willd.) Pers.
MAGNOLIACEÆ.	
Magnolia Umbrella. Lam., 1789.	Magnolia tripetala. L., 1763.
M. glauca.* L.	M. Virginiana. L.
RANUNCULACEÆ.	
Actæa spicata var. rubra Mx.	Actæa rubra (Ait.) Willd.
Delphinium exaltatum Ait., 1789.	Delphinium urceolatum Jacq., 1786.
D. azureum Michx., 1803.	D. Carolinianum Walt., 1788.
Anemone Pennsylvanica L., 1771.	Anemone Canadensis L., 1768.
A. nemorosa, Mx., 1803. [Not L., 1753.]	A. quinquefolia, L., 1753.
Hepatica triloba Chaix., 1786.	Hepatica Hepatica (L., 1753.) Karst.
H. acutiloba DC., 1824.	H. acuta (Pursh, 1814.) Britton.
Thalictrum anemonoides Mx., 1803. Or Anemonella thalictroides Spach.	Syndesmon [Hoffmg., 1832] thalictroides. (L., 1753.) Hoffmg.
Anemone patens var. Nuttalliana [DC., 1818.] A. Gray.	Pulsatilla hirsutissima (Pursh, 1814.) Britton.
Clematis Pitcheri Torr. & Gr., 1838.	Clematis Simsii Sweet, 1827.
C. ovata Torr. & Gr., 1838. [Not Pursh, 1814.]	C. Addisonii Britton, 1890.
Trauvetteria palmata [Mx., 1803.] Fisch. & Mey.	Trauvetteria Carolinensis (Walt., 1788.) Vail.
Ranunculus multifidus Pursh, 1814. [Not Forsk., 1775.]	Ranunculus delphinifolius Torr., 1818.
R. multifidus var. repens S. Wats., 1871.	R. Purshii Richard, 1823.
R. Flammula var. reptans E. Meyer.	R. reptans L.
R. alismæfolius A. Gray, 1868. [Not Geyer, 1848.]	R. obtusiusculus Raf., 1808.
R. rhomboideus Goldie, 1822.	R. ovalis Raf., 1814.
R. abortivus var. micranthus A. Gray.	R. micranthus Nutt.
Ranunculus, in part.	Batrachium, S. F. Gray, 1821.
R. aquatilis var. trichophyllus Chaix.	B. trichophyllum (Chaix.) Bossch.

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* Name applied by Linné to a variety of M. Virginana.

Current Names.	*Corrected Names.*
R. divaricatus Schrank.	B. divaricatum (Schrank.) Wimm.
R. hederaceus L.	B. hederaceum (L.) S. F. Gray.
Ficaria ranunculoides Mœnch., 1794.	Ficaria Ficaria (L., 1853.) Karst.
Ranunculus, in part.	Cyrtorhyncha, Nutt., 1838.
R. Nuttallii A. Gray, 1863.	C. ranunculina Nutt., 1838.
R. Cymbalaria Pursh.	Oxygraphis [Bunge., 1838.] Cymbalaria (Pursh) Prantl.
Thalictrum Cornuti Torr. & Gray, 1838. [Not L., 1753.]	Thalictrum polygamum Muhl., 1813.
MENISPERMACEÆ.	
Cocculus, DC., 1818.	Cebatha, Forsk., 1775.
C. Carolinus DC.	C. Carolina (L.) Britton.
CALYCANTHACEÆ.	
Calycanthus, L., 1759.	Butneria Duham., 1755.
C. floridus L.	B. florida (L.) Kearney.
C. lævigatus Willd., 1809. And C. glaucus Willd.	B. fertilis (Walt., 1788.) Kearney.
LAURACEÆ.	
Persea Carolinensis var. palustris Chapm., 1860.	Persea pubescens (Pursh, 1814.) Sarg.
P. Carolinensis Nees, 1831.	P. Borbonia (L., 1753.) Spreng.
Sassafras officinale Nees, 1831.	Sassafras Sassafras (L., 1753.) Karst.
Tetranthera, Jacq., 1797.	Malapœnna, Adanson, 1763.
T. geniculata Nees.	M. geniculata (Walt.) Coulter.
Lindera Benzoin Meisner. Or Benzoin odoriferum Nees.	Benzoin Benzoin (L.) Coulter.
L. melissæfolia Blume.	B. melissæfolium (Walt.) Nees.
PAPAVERACEÆ.	
Glaucium luteum Scop., 1772.	Glaucium Glaucium (L., 1753.) Karst.
Dicentra, Bernh., 1833. Or Dielytra, Borck., 1797.	Bicuculla, Adanson, 1763.
Dicentra Cucullaria Torr.	B. Cucullaria (L.) Millsp.
D. Canadensis Walt.	B. Canadensis (Goldie.) Millsp.
D. eximia Torr.	B. eximia (Ker.) Millsp.
Adlumia cirrhosa Raf., 1808.	Adlumia fungosa (Ait., 1789.) Greene.
Corydalis, Vent., 1803.	Capnoides, Adanson, 1763.
C. glauca Pursh, 1814.	C. sempervirens (L., 1753.) Borck.
C. flavula Raf.	C. flavulum (Raf.) Kze.
C. aurea var., micrantha Engelm.	C. micranthum (Engelm.) Britton.
C. aurea Willd.	C. aureum (Willd.) Kze.
C. curvisiliqua Engelm.	C. curvisiliquum (Engelm.) Kze.
C. crystallina Engelm.	C. crystallinum (Engelm.) Kze.
CRUCIFERÆ.	
Stanleya pinnatifida Nutt., 1818.	Stanleya pinnata (Pursh, 1814.) Britton.
Lepidium intermedium A. Gray, 1856. [Not A. Rich., 1847.]	Lepidium apetalum Willd., 1801.
Senebiera didyma Pers.	Coronopus [Gaertn., 1791] didymus (L.) J. E. Smith.
S. Coronopus Poir.	C. Coronopus (L.) Karst.
Sisymbrium Alliaria Scop.	Alliaria Alliaria (L.) Britton.

Current Names.	*Corrected Names.*
Cakile Americana Nutt., 1818.	Cakile edentula (Bigel., 1814.) Hook.
Brassica sinapistrum Boissier, 1839–45.	Brassica arvensis (L.) B. S. P.
Barbarea vulgaris R. Br., 1812. And B. vulgaris var. arcuata A. Gray, 1856.	Barbarea Barbarea (L., 1753.) MacM.
B. vulgaris var. stricta A. Gray.	B. stricta Andrz.
Nasturtium, R. Br., 1812.	Roripa, Scop., 1760.
N. sylvestre R. Br.	R. sylvestris (L.) Bess.
N. sinuatum Nutt.	R. sinuata (Nutt.) A. S. Hitchcock.
N. obtusum Nutt.	R. obtusa (Nutt.) Britton.
N. sphærocarpum A. Gray.	R. sphærocarpa (A. Gray.) Britton.
N. palustre DC.	R. palustris (L.) Bess.
N. palustre var. hispidum A. Gray.	R. hispida (Desv.) Britton.
N. curvisiliqua (Sic.) Nutt.	R. curvisiliqua (Hook.) Bessey.
N. sessiliflorum Nutt.	R. sessiliflora (Nutt.) A. S. Hitchcock.
N. officinale R. Br., 1812.	R. Nasturtium (L., 1753.) Rush.
N. lacustre A. Gray, 1848.	R. Americana (A. Gray, 1836.) Britton.
Cardamine Virginica Mx., 1803. [Not L., 1753.]	Cardamine arenicola Britton, 1892.
C. hirsuta var. sylvatica A. Gray, 1867.	C. parviflora L. 1763.
C. rhomboidea var. purpurea Torr.	C. purpurea (Torr.) Britton.
C. rhomboidea DC., 1821.	C. bulbosa (Schreb., 1793.) B. S. P.
Leavenworthia Michauxii Torr., 1837.	Leavenworthia uniflora (Mx., 1803.) Britton.
Vesicaria Shortii T. & Gr., 1838.	Lesquerella [S. Wats., 1888] globosa (Desv., 1814). S. Wats.
Capsella, Medic. Pfl. Gatt., 1792.	Bursa, Weber, 1786.
C. Bursa-pastoris Mœnch.	B. Bursa-pastoris (L.) Britton.
Draba arabisans Mx.	Draba incana arabisans (Mx.) S. Wats.
Sisymbrium Sophia L.	Sophia Sophia (L.) Britton.
S. canescens Nutt., 1818.	S. pinnata (Walt., 1788.) Britton.*
S. Thalianum Gay.	Stenophragma [Celak., 1877] Thaliana (L.) Celak.
Erysimum† orientale R. Br.	Conringia orientalis (L.) Dumort.
Arabis Ludoviciana [Hook., 1834.] Meyer.	Arabis Virginica (L., 1753.) Trelease.
Alyssum calycinum L.	Alyssum alyssoides (L.) Gouan.

CAPPARIDACEÆ.

Cleome integrifolia T. & Gr., 1838.	Cleome serrulata Pursh, 1814.
C. pungens Willd., 1809.	C. spinosa L., 1763.

CRASSULACEÆ.

Tillæa simplex Nutt., 1817.	Tillæa aquatica L., 1753.
Sedum Rhodiola DC., 1805.	Sedum roseum (L., 1753.) Scop.

SAXIFRAGACEÆ.

Astilbe decandra Don, 1825.	Astilbe biternata (Vent., 1803.) Britton.
Saxifraga Forbesii Vasey.	Included in Saxifraga Pennsylvanica L.
S. erosa Pursh, 1814.	S. micranthidifolia (Haw., 1812.) B. S. P.
S. stellaris var. comosa Willd.	S. comosa (Poir.) Britton.

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* According to A. Heller, this should be S. pinnata. (Walt.) Howell.

† The remaining species of Erysimum are referred by Heller, but not by Britton and Brown, to the genus Cheiranthus.

Current Names.	*Corrected Names.*
S. Caroliniana A. Gray, 1846. [Not Schleich., 1821.]	S. Grayana Britton, 1894.
S. leucanthemidifolia Mx., 1803. [Not Le Page, 1795–1801.]	S. Michauxii Britton, 1894.
Boykinia, Nutt., 1834. [Not Raf.]	Therofon, Raf., 1836.
B. aconitifolia Nutt.	T. aconitifolium (Nutt.) Millsp.
Sullivantia Ohioensis T. & Gr., 1842.	Sullivantia Sullivantii (T. & Gr., 1840.) Britton.

GROSSULARIACEÆ.

Ribes hirtellum Mx., 1803.	Ribes oxyacanthoides (L.), 1753.

HAMAMELIDACEÆ.

Fothergilla alnifolia L. f., 1781.	Fothergilla Carolina (L., 1771). Britton.

ROSACEÆ.

Spirea Aruncus L.	Aruncus [Adans., 1763] Aruncus (L.) Karst.
Gillenia, Moench, 1802. [Not Adanson, 1763.]	Porteranthus, Britton, 1894.
G. trifoliata Moench.	P. trifoliatus (L.) Britton.
G. stipulacea Nutt., 1818.	P. stipulatus (Muhl., 1809.) Britton.
Rubus Nutkanus Mocino, 1825.	Rubus parviflorus Nutt., 1818.
Current Names.	*Corrected Names.*
R. triflorus Richards, 1823.	R. Americanus (Pers., 1807.) Britton.
R. villosus var. montanus Porter, 1890 [Not R. montanus Ort., 1852.]	R. Alleghaniensis Porter, 1896.
R. hispidus var. setosus T. & Gr.	R. setosus Bigel.
R. villosus var. humifusus T. & Gr., 1840. [Not R. humifusus Weihe, 1825.]	R. Baileyanus Britton, 1894.
Fragaria vesca var. Americana Porter.	Fragaria Americana (Porter) Britton.
F. Indica Andr.	Duchesnea [J. E. Sm., 1811] Indica (Andr.) Focke.
Potentilla frigida A. Gray, 1867. [Not Vill., 1789.]	Potentilla Robbinsiana Oakes, 1840.
P. Norvegica L., 1753.	P. Monspeliensis L., 1753.
P. Canadensis var. pumila Tor. & Gr.	P. pumila Poir.
P. millegrana Engelm., 1849. [Not Dougl., 1833.]	P. leucocarpa Rydberg.
Geum triflorum Pursh, 1814.	Geum ciliatum Pursh, 1814.
G. album Gmel., 1791.	G. Canadense Jacq., 1772.
G. album var. flavum Porter.	G. flavum (Porter) Bicknell.
Spiræa lobata [Gronov., 1770.] Murr.	Ulmaria [Hill, 1769] rubra Hill., 1769.
S. Ulmaria L.	U. Ulmaria (L.) Barnhart.
Agrimonia Eupatoria var. hirsuta Muhl.	Agrimonia hirsuta (Muhl.) Bicknell.
A. parviflora DC., 1821. [Not Soland., 1789.]	A. striata Michx, 1803.
A. Eupatoria var. mollis T. & Gr.	A. mollis (T. & Gr.) Britton.
Poterium Sanguisorba L.	Sanguisorba Sanguisorba (L.) Brit.
P. Canadensis Gray.	S. Canadensis L.
Rosa Sayi Schwein. And R. Engelmanni S. Wats.	Included in Rosa acicularis Lindl.

Current Names.	*Corrected Names.*
Rosa lucida Erhr.	Rosa humilis lucida Erhr.
R. micrantha J. E. Smith.	Included in R. rubiginosa L.
POMACEÆ (*Rosaceæ in part*).	
Pyrus Americana DC.	Sorbus Americana Marsh.
Pyrus sambucifolia Cham. & Schlecht.	S. sambucifolia (C. & S.) Rœm.
Pyrus angustifolia Ait.	Malus augustifolia (Ait.) Mx.
P. Coronaria L.	M. Coronaria (L.) Mill.
P. Coronaria var. Ioensis Wood.	M. Ióensis (Wood.) Britton.
P. Malus L.	M. Malus (L.) Britton.
P. arbutifolia L.	Aronia [Pers., 1807] arbutifolia (L.) Ell.
P. arbutifolia var. melanocarpa Mx., 1803.	A. nigra (Willd., 1800.) Britton.
Amelanchier Canadensis var. Botryapium T. & Gr.	Amelanchier Botryapium L. fils.
A. Canadensis var. rotundifolia T. & Gr.	A. rotundifolia (Mx.) Rœm.
A. Canadensis var. alnifolia T. & Gr.	A. alnifolia Nutt.
A. Canadensis var. oligocarpa T. & Gr.	A. oligocarpa (Mx.) Rœm.
Cratægus tomentosa var. punctata Jacq.	Cratægus punctata Jacq.
C. arborescens Ell., 1821.	C. viridis L., 1753.
C. glandulosa Willd., 1800. [Not Soland., 1789.]	C. rotundifolia (Erhr., 1788.) Borck.
C. tomentosa var. mollis T. & Gr.	C. mollis (T. & Gr.) Scheele.
DRUPACEÆ (*Rosaceæ in part*).	
Prunus Chicasa Mx., 1803.	Prunus angustifolia Marsh., 1785.
MIMOSACEÆ. (*Leguminosæ in part.*)	
Desmanthus, Willd., 1806.	Acuan, Med. Theod., 1786.
D. brachylobus [Willd., 1806.] Benth.	A. Illinoensis. (Mx., 1803.) Kze.
D. leptolobus T. & Gr.	A. leptoloba. (T. & Gr.) Kze.
Schrankia, Willd., 1806. [Not Medic., 1792.]	Morongia, Britton, 1894.
S. uncinata Willd.	M. uncinata, (Willd.) Britton.
S. angustata Tor. & Gr.	M. angustata (T. & Gr.) Britton.
CAESALPINACEÆ. (*Leguminosæ in part.*)	
Cassia obtusifolia L., 1753.	Cassia Tora L., 1753.
Gleditschia monosperma Walt., 1788.	Gleditsia aquatica Marsh, 1785.
Gymnocladus Canadensis Lam., 1783.	Gymnocladus dioica (L.) Koch.
PAPILIONACEÆ. (*Leguminosæ in part.*)	
Cladastris tinctoria Raf., 1825.	Cladastris lutea (Mx., 1813.) Koch.
Baptisia leucophœa Nutt., 1818.	Baptisia bracteata Ell., 1813.
Medicago maculata Willd., 1794.	Medicago Arabica All., 1785.
Trifolium procumbens var. minus [J. E. Sm., 1799.] Koch.	Trifolium dubium Sibth., 1794.
Hosackia Purshiana Benth., 1829.	Lotus Americanus (Nutt., 1818.) Bisch.
Psoralea melilotoides Mx., 1803.	Psoralea pedunculata (Mill., 1768.) Vail.
Amorpha microphylla Pursh, 1814.	Amorpha nana Nutt., 1813.
Dalea, Willd., 1803. [Not P. Br., 1756.]	Parosela, Cav., 1802.
D. laxiflora Pursh, 1814.	P. enneandra (Nutt., 1813.) Brit.
D. alopecuroides Willd., 1803.	P. Dalea (L., 1753.) Brit.
D. lanata Spreng.	P. lanata (Spreng.) Britton.
D. aurea Nutt.	P. aurea (Nutt.) Britton.
D. nana Torr.	P. nana (Torr.) Heller.

Current Names.	*Corrected Names.*
Petalostemon, Michx., 1803.	Kuhnistera, Lam., 1789.
P. macrostachys Torr., 1828.	K. compacta (Spreng., 1826.) Kze.
P. candidus Mx.	K. candida (Willd.) Kze.
P. violaceus Mx., 1803.	K. purpurea (Vent., 1800.) MacM.
P. villosus Nutt.	K. villosa (Nutt.) Kze.
Tephrosia, Pers., 1807.	Cracca, L., 1753.
T. Virginiana Pursh.	C. Virginiana L.
T. spicata Tor. & Gr.	C. spicata (Walt.) Kze.
T. hispidula Pursh.	C. hispidula (Mx.) Kze.
Wistaria, Nutt., 1818.	Kraunhia, Raf., 1808.
W. frutescens DC.	K. frutescens (L.) Greene.
W. frutescens, var. macrostachys T. & Gr.	K. macrostachys (Tor. & Gr.) Small.
Sesbania [Scop., 1777] macrocarpa Muhl.	Sesban [Adans., 1763] macrocarpa Muhl.
Astragalus caryocarpus Ker., 1816.	Astragalus crassicarpus Nutt., 1813.
A. Canadensis L., 1753.	A. Carolinensis L., 1753.
A. frigidus, var. Americanus S. Wats.	Phaca [L., 1753] Americana (Hook.) Rydberg.
A. Cooperi A. Gray, 1856.	P. neglecta Torr. & Gr., 1838.
A. pictus var. filifolius Gray, 1864.	P. longifolia (Pursh, 1814.) Nutt.
A. multiflorus [T. & G.. 1838.] A. Gray.	Homalobus [Nutt., 1838] tenellus Pursh, 1814.) Britton.
A. Kentrophyta A. Gray, 1863.	H. montanus (Nutt., 1838.) Britton.
A. cæspitosus A. Gray.	H. cæspitosus Nutt.
A. triphyllus Pursh, 1814. [Not Rall., 1800.] Or, Phaca cæspitosus Nutt.	Orophaca [Britton, 1897] cæspitosa (Nutt., 1818.) Britton.
A. sericoleucus A. Gray, 1862.	O. sericea (Nutt., 1838.) Britton.
Oxytropis DC., 1802.	Spiesia,* Neck., 1790.
O. podocarpa A. Gray, 1864.	S. inflata (Hook., 1833.) Britton.
O. multiceps Nutt.	S. multiceps (Nutt.) Kze.
O. Lamberti Pursh.	S. Lamberti (Pursh) Kze.
O. splendens Dougl.	S. splendens (Dougl.) Kze.
O. arctica R. Br.	S. arcticus (R. Br.) Kze.
O. campestris DC.	S. campestris (L.) Kze.
Hedysarum boreale Nutt., 1818.	Hedysarum Americanum (Mx., 1803.) Brit.
Aeschynomene hispida Willd., 1800.	Aeschynomene Virginica (L., 1753.) B. S. P.
Stylosanthes elatior Swz., 1789.	Stylosanthes biflora (L., 1753.) B. S. P.
Zornia tetraphylla Mx., 1803.	Zornia bracteata (Walt., 1788.) Gmel.
Desmodium, Desv., 1812.	Meibomia, Adans., 1763.
D. nudiflorum DC.	M. nudiflora (L.) Kze.
D. acuminatum [Mx., 1803.] DC.	M. grandiflora (Walt., 1788.) Kze.
D. pauciflorum DC.	M. pauciflora (Nutt.) Kze.
D. lineatum DC. [Mx., 1803. Not L., 1759.]	M. arenicola (Vail, 1896.)
D. rotundifolium DC. [Mx., 1803. Not Vahl., 1791.]	M. Michauxii Vail, 1896.
D. ochroleucum M. A. Curtis.	M. ochroleuca (M. A. Curtis.) Kze.
D. humifusum Beck, 1833.	M. glabella (Mx., 1803.) Kze.
D. sessilifolium Torr. & Gr.	M. sessilifolia (Torr.) Kze.
D. strictum DC.	M. stricta (Pursh) Kze.

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* In Heller's list, these species (no pun intended) are referred to Aragallus.

Current Names.	*Corrected Names.*
D. canescens DC.	M. canescens (L.) Kze.
D. Canadense var. longifolium T. & Gr.	M. longifolia (T. & Gr.) Kze.
D. cuspidatum Hook., 1835.	M. bracteosa (Mx., 1803.) Kze.
D. paniculatum DC.	M. paniculata (L.) Kze.
D. lævigatum DC.	M. lævigata (Nutt.) Kze.
D. rhombifolium Chapm.	M. rhombifolia (Ell.) Vail.
D. viridiflorum Beck.	M. viridiflora (L.) Kze.
D. Dillenii Darlington.	M. Dillenii (Darling.) Kze.
D. Illinoense A. Gray.	M. Illinoensis (A. Gray) Kze.
D. Canadense A. Gray.	M. Canadensis (L.) Kze.
D. rigidum DC.	M. rigida (L.) Kze.
D. Marylandicum Booth.	M. Marylandica (L.) Kze.
D. ciliare [Willd., 1803.] DC.	M. obtusa (Muhl., 1803.) Vail.
Lespedeza Stuvei var. intermedia S. Wats., 1890.	Lespedeza frutescens (L., 1753.) Britton.
L. violacea var. angustifolia T. & Gr., 1840.	L. Virginica (L., 1753.) Britton.
L. capitata var. angustifolia Pursh.	L. angustifolia (Pursh) Ell.
Vicia Americana var. linearis S. Wats.	Vicia linearis (Nutt.) Greene.
V. sativa var. angustifolia Sim.	V. angustifolia, Roth.
Lathyrus palustris, var. myrtifolius. A. Gray.	Lathyrus myrtifolius. Muhl.
L. polymorphus Nutt., 1818.	L. decaphyllus Pursh, 1814.
Centrosema, Benth., 1838.	Bradburya, Raf, 1817.
C. Virginianum Benth.	B. Virginiana, (L.) Kze.
Amphicarpa, Ell., 1817.	Falcata, Gmel., 1796.
Amphicarpæa monoica, [L., 1763]. Nutt.	Falcata comosa (L., 1753.) Kze.
A. Pitcheri Torr. & Gr.	F. Pitcheri (T. & Gr.) Kze.
Apios tuberosa Moench, 1794.	Apios Apios (L., 1753.) MacM.
Galactia glabella Mx., 1803.	Galactia regularis (L., 1753.) B. S. P.
G. mollis Nutt., 1818. [Not Mx., 1803].	G. volubilis (L., 1753.) Britton.
Rhyncosia tomentosa var., erecta T. & Gr.	Rhynchosia erecta (Walt.) D. C.
R. tomentosa var. volubilis T. & Gr.	R. tomentosa (L.) H. & A.
R. tomentosa var., monophylla T. & Gr.	R. simplicifolia (Walt.) Wood.
Phaseolus perennis Walt., 1788.	Phaseolus polystachyus (L., 1753.) B. S. P.
P. diversifolius Pers., 1807.	Strophostyles [Ell., 1822.] helvola (L., 1753.) Brit.
P. helvolus T. & Gr., 1838. [Not L., 1753.]	S. umbellata (Muhl., 1803.) Britton.
P. pauciflorus Benth.	S. pauciflora (Benth.) S. Wats.
Dolichos Catjang L., 1767.	Vigna Sinensis (L., 1756.) Endl.

LINACEÆ.

Linum perenne var. Lewisii Eat. & Wr.	Linum Lewisii. Pursh.
L. Virginianum var. medium Planch.	L. medium (Planch.) Britton.
L. Virginianum var. Floridanum Planch.	L. Floridanum (Planch.) Trel.

RUTACEÆ.

Xanthoxylum Carolinianum Lam., 1786.	Xanthoxylum Clava-Herculis L., 1753.

POLYGALACEÆ.

Polygala sanguinea L., 1753.	Polygala viridescens L., 1753.
P. fastigiata Nutt., 1818.	P. Mariana Mill., 1768.
P. Senega var. tenuifolia. Pursh, 1814. [Not P. tenuifolia. Willd., 1803.]	P. alba Nutt., 1818.

Current Names.	*Corrected Names.*
EUPHORBIACEÆ.	
Acalypha Carolinianum Ell., 1824. [Not Walt., 1788.]	Acalypha ostryæfolia Ridd., 1835.
Jatropha urens var. stimulosa Muell.	Jatropha stimulosa Michx.
Euphorbia arenaria Eng. & Gr., 1847. [Not Nutt., 1837.]	Euphorbia nutans Lag., 1816.
E. hypericifolia A. Gray, 1848. [Not L., 1753.]	E. Nuttallii (Engelm., 1859.) Small.
E. hypericifolia var. hirsuta Torr.	E. hirsuta (Torr.) Wiegand.
E. dentata var. cuphosperma Engelm.	E. cuphosperma (Engelm.) Boiss.
CALLITRICHACEÆ.	
Callitriche verna L., 1755.	Callitriche palustris L., 1753.
C. autumnalis L., 1855.	C. bifida (L., 1753.) Morong.
ANACARDIACEÆ.	
Rhus typhina L., 1760.	Rhus hirta (L., 1753.) Sudw.
R. aromatica var. trilobata A. Gray.	R. trilobata Nutt.
R. venenata DC., 1825.	R. vernix L., 1753.
R. Toxicodendron Auct. [Not L., 1753.]	R. radicans L., 1753.
R. cotinoides Nutt.	Cotinus cotinoides (Nutt.) Britton.
ILICACEÆ.	
Ilex Dahoon Walt., 1788.	Ilex Cassine L., 1753.
I. Cassine Walt., 1788. [Not L., 1753.]	I. vomitoria Ait., 1789.
Prinos coriaceus Pursh, 1818. Or Ilex coriacea Chapman.	I. lucida (Ait., 1789.) Tor. & Gr.
Nemopanthes, Raf, 1819.	Ilicioides, Dumont, 1802.
N. Canadensis DC., 1821.	I. mucronata (L., 1753.) Britton.
CELASTRACEÆ.	
Euonymus Americanus var. obovatus Tor. & Gr.	Euonymus obovatus Nutt.
ACERACEÆ. (*Sapindaceæ in part.*)	
Acer dasycarpum Erhr., 1789.	Acer saccharinum L., 1753.
A. rubrum var. Drummondii Sarg.	A. Drummondii H. & A.
A. saccharinum Wang., 1787. [Not L., 1753.]	A. Saccharum Marsh., 1785.
A. saccharinum var. nigrum T. & Gr.	A. nigrum Michx.
Negundo aceroides Moench., 1794.	A. Negundo L., 1753.
HIPPOCASTANACEÆ. (*Sapindaceæ in part.*)	
Æsculus flava Ait., 1889.	Æsculus octandra Marsh., 1785.
BALSAMINACEÆ.	
Impatiens fulva Nutt., 1818.	Impatiens biflora Walt., 1788.
I. pallida Nutt., 1818.	I. aurea Muhl., 1813.
RHAMNACEÆ.	
Berchemia volubilis DC., 1825.	Berchemia scandens (Hill, 1768.) Trel.
Ceanothus ovalis Bigel., 1824.	Ceanothus ovatus Desf., 1809.
VITACEÆ.	
Vitis æstivalis var. cinerea Engelm.	Vitis cinerea Engelm.
V. æstivalis var. bicolor Le Conte.	V. bicolor Le Conte.
V. riparia Mx., 1803.	V. vulpina L., 1753.
V. vulpina T. & G., 1838. [Not L., 1753.]	V. rotundifolia Mx., 1803.

Current Names.	*Corrected Names.*
V. indivisa Willd., 1811.	Ampelopsis cordata Mx., 1803.
V. bipinnata Torr. & Gr., 1838.	A. arborea (L., 1753.) Rusby.
Ampelopsis quinquefolia Michx.	Parthenocissus [Planch., 1887] quinquefolia (L.) Planch.
A. Veitchii Auct.	P. tricuspidata (Sieb. & Zacc.) Planch.
TILIACEÆ.	
Tilia Americana, var. pubescens Loud. and T. Americana, var. Walteri Wood.	Tilia pubescens Ait.
MALVACEÆ.	
Sida Napæa Cav., 1788.	Sida hermaphrodita (L., 1753.) Rusby.
Abutilon Avicennæ Gærtn., 1791.	Abutilon Abutilon (L., 1773.) Rusby.
Sphæralcea rivularis Torr., 1848.	Sphæralcea acerifolia Nutt., 1838.
S. angustifolia, var. cuspidata A. Gray.	S. cuspidata (A. Gray.) Brit.
Modiola multifida Mœnch, 1791.	Modiola Caroliniana (L., 1753.) Don.
THEACEÆ. (*Ternstrœmiaceæ in part.*)	
Stewartia Virginica Cav., 1787.	Stuartia malachodendron L., 1753.
HYPERICACEÆ.	
Ascyrum Crux-Andreæ L., 1763. [Not L., 1753.]	Ascyrum hypericoides L., 1753.
Hypericum pyramidatum Ait., 1789.	Hypericum Ascyron L., 1753.
H. prolificum var. densiflorum A. Gray.	H. densiflorum Pursh.
H. angulosum Mx., 1803.	H. virgatum Lam., 1797.
H. corymbosum Muhl., 1803.	H. maculatum Walt., 1788.
H. mutilum var. gymnanthemum A. Gray.	H. gymnanthemum Engelm. & Gr.
H. Canadense var. major A. Gray.	H. majus (A. Gray.) Britton.
H. Sarothra Mx., 1803.	Sarothra [L., 1753] gentianoides L., 1753.
Elodea, Pursh, 1803. [Not Mx., 1763.]	Triadenum, Raf., 1808.
E. Virginica Nutt.	T. Virginicum (L.) Raf.
E. petiolata Pursh.	T. petiolatum (Walt.) Britton.
CISTACEÆ.	
Lechea major Mx., 1803. [Not L., 1753.]	Lechea villosa Ell., 1817.
L. thymifolia Pursh, 1814. [Not Mx., 1803.]	L. maritima Leggett, 1881.
L. Novæ Cæsareæ Aust., 1867.	L. minor L., 1753.
L. minor Lam., 1791. [Not L., 1753.]	L. Leggettii Brit. & Holl., 1888.
VIOLACEÆ.	
Viola cucullata var. palmata A. Gray.	Viola palmata L.
V. delphinifolia Nutt., 1838.	V. pedatifida Don., 1831.
V. sagittata var. ovata T. & Gr.	V. ovata Nutt.
V. sagittata var. emarginata Nutt.	V. emarginata (Nutt.) Le Conte.
V. pubescens var. scabriuscula T. & Gr.	V. scabriuscula (T. & Gr.) Schwein.
V. Muhlenbergii Torr., 1824.	V. Labradorica Schrank, 1818.
V. canina var. puberula S. Wats., 1890.	V. arenaria DC., 1805.
V. Muhlenbergii var. multicaulis T. & Gr.	V. multicaulis (T. & Gr.) Britton.
V. tricolor var. arvensis [Hook., 1830.] DC.	V. tenella Muhl., 1813.
Solea, Spreng, 1813. [Not Spreng., 1800.]	Cubelium, Raf., 1824.
S. concolor Ging.	C. concolor (Forst.) Raf.
Ionidium, Vent., 1803.	Calceolaria, Lœfl., 1758.
I. lineare Torr., 1827.	C. verticillata (Ort., 1797.) Kze.

Current Names.	*Corrected Names.*
LOASACEÆ.	
Mentzelia ornata Tor. & Gr., 1840.	Mentzelia decapetala (Pursh, 1812.) Urban & Gilg.
CACTACEÆ.	
Cereus viridiflorus Engelm.	Echinocereus [Engelm., 1848] viridiflorus Engelm.
C. cæspitosus Engelm.	E. cæspitosus Engelm. & Gr.
Mamillaria [Haw., 1812, not Stackh., 1809.] Missouriensis Sweet.	Cactus Missouriensis (Sweet.) Kze.
M. vivipara Haw.	C. viviparus Nutt.
Opuntia vulgaris Mill., 1768.	Opuntia Opuntia (L., 1753.) Coult.
O. Rafinesquii Engelm., 1856.	O. humifusa Raf., 1820.
O. Missouriensis DC., 1828.	O. polyacantha Haw., 1819.
ELEAGNACEÆ.	
Shepherdia, Nutt., 1818.	Lepargyræa, Raf., 1817.
S. Canadensis Nutt.	L. Canadensis (L.) Greene.
S. argentea Nutt.	L. argentea (Nutt.) Greene.
LYTHRACEÆ.	
Ammannia latifolia, T. &. G., 1840. [Not L., 1753.]	Ammannia coccinea Rottb., 1773.
A. humilis b. T. &. Gr., 1840.	A. Koehnei Britton, 1891.
A. Wrightii A. Gray, 1853.	A. auriculata Willd., 1806.
A. humilis Mx., 1803.	Rotala [L., 1771] ramosior (L., 1753). Koehne.
Nessæa verticillata H. B. K.	Decodon [J. F. Gmel., 1791] verticillatus (L.). Ell.
Cuphæa, P. Br., 1756 (p. 216).	Parsonsia, P. Br., 1756 (p. 199).
C. viscosissima Jacq., 1772.	P. petiolata (L., 1753.) Rusby.
ONAGRACEÆ.	
Ludwigia palustris Ell.	Isnardia [L., 1753] palustris L.
L. arcuata Walt.	Ludwigiantha [Small, 1897] arcuata (Walt.). Small.
L. cylindrica Ell., 1817.	Ludwigia glandulosa Walt., 1788.
Jussiæa repens Sw., 1791. [Not L.]	Jussiæa diffusa Forsk., 1775.
Epilobium latifolium L.	Chamænerium [Adans., 1763] latifolium (L.). Sweet.
E. angustifolium L.	C. angustifolium (L.) Scop.
E. palustre var. lineare A. Gray.	Epilobium lineare Muhl.
E. molle Torr., 1824. [Not Lam., 1805.]	E. strictum Muhl., 1813.
E. alpinum var. majus Wahl. [A. Gray, 1867.]	E. Hornemanni Reichenb., 1824.
Oenothera biennis var. cruciata T. & Gr.	Onagra [Adans., 1763] cruciata (Nutt.) Small.
Oe. muricata L., and Oe. biennis L.	Included in O. biennis (L.) Scop.
Oe. biennis var. Oaksiana A. Gray.	O. Oaksiana (A. Gray.) Britton.
Oe. sinuata L., 1771.	Oenothera laciniata Hill, 1767.
Oe. coronopifolia T. &. Gr.	Anogra [Spach., 1835] coronopifolia (T. & Gr.) Britton.
Oe. pinnatifida Nutt., 1818.	A. albicaulis (Pursh, 1814, not Nutt., 1818.) Britton.

Current Names.	*Corrected Names.*
Oe. albicaulis Nutt., 1813. [Not Pursh, 1814.]	A. pallida (Lindl., 1828.) Britton.
Oe. linifolia Nutt.	Kneiffia [Spach., 1835] linifolia (Nutt.) Spach.
Oe. fruticosa var. humifusa Allen, 1870. [Not Oe. humifusa Nutt., 1818.]	K. Alleni (Brit., 1896.) Small.
Oe. linearis Mx.	K. linearis (Mx.) Spach.
Oe. pumila L. And Oe. chrysantha Mx.	K. pumila (L.) Spach.
Oe. fruticosa L.	K. fruticosa (L.) Raiman.
Oe. glauca Mx.	K. glauca (Mx.) Spach.
Oe. speciosa Nutt.	Hartmannia [Spach., 1835] speciosa (Nutt.) Small.
Oe. cæspitosus Nutt.	Pachylopphus [Spach., 1835] cæspitosus (Nutt.) Raiman.
Oe. triloba Nutt.	Lavauxia [Spach., 1835] triloba (Nutt.) Spach.
Oe. brachycarpa A. Gray.	L. brachycarpa (A. Gray.) Britton.
Oe. canescens Torr., 1845. [Not T. & Gr., 1840.	Guarella [Small, 1896] guttulata (Geyer, 1847.) Small.
Oe. Missouriensis Sims.	Megapterium [Spach., 1835] Missouriensis (Sims.) Spach.
Oe. Fremontii S. Wats.	M. Fremontii (S. Wats.) Britton.
Oe. Hartwegi Benth. And Oe. lavendulæfolia T. & Gr.	Galpinsia [Brit., 1894] Hartwegi (Benth.) Britton.
Oe. serrulata Nutt.	Meriolix [Raf., 1818] serrulata (Nutt.) Walp.
Gaura filipes Spach., 1835.	Gaura Michauxii Spach., 1835.
G. linifolia Nutt. And Stenosiphon virgatus Spach., 1835.	Stenosiphon [Spach., 1835] linifolium (Nutt., 1823.) Britton.

HAROLAGIDACEÆ.

Proserpinaca pectinacea T. & Gr., 1840.	Proserpinaca pectinata Lam., 1791.
Myriophyllum ambiguum Nutt., 1818.	Myriophyllum humile (Raf., 1808.) Morong.
M. scabratum Mx., 1803.	M. pinnatum (Walt., 1788.) B. S. P.

UMBELLIFERÆ.

Archangelica atropurpurea Hoffm.	Angelica atropurpurea L.
Archangelica hirsuta T. & Gr. Or Angelica hirsuta Muhl., 1818.	A. villosa (Walt., 1788.) B. S. P.
Conioselinum Canadense T. & Gr. Or Selinum Canadense Mx., 1803.	Conioselinum Chinense (L., 1753.) B. S. P.
Tiedmannia, DC., 1829.	Oxypolis, Raf., 1825.
T. teretifolia DC., 1813.	O. filiformis (Walt., 1788.) Britton.
Archemora [DC., 1829] rigida D. C.	O. rigidus (L.) Britton.
Peucedanum graveolens S. Wats., 1871. Not Anethum graveolens L.	Peucedanum Kingii S. Wats., 1887.
Cymopterus glomeratus Raf., 1819.	Cymopterus acaulis (Pursh, 1814.) Rydberg.
Thaspium trifoliatum var. atropurpureum [Desr., 1789.] T. & Gr. Or Thaspium atropurpureum. Nutt.	Thaspium trifoliatum (L., 1753.) Brit.

Current Names.	*Corrected Names.*
T. aureum Nutt.	T. trifoliatum aureum (Nutt.) Britton.
Ligusticum actæifolium Mx., 1803.	Ligusticum Canadense (L., 1753.) Brit.
Archangelica Gmelini DC. Or A. peregrina Nutt.	Cœlopleurum [Ledeb., 1844] Gmelini (DC.) Ledeb.
Crantzia, Nutt., 1818. [Not Scop., 1777.]	Lilæopsis Greene, 1891.
C. lineata Nutt.	L. lineata (Mx.) Greene.
Eryngium yuccaefolium Mx., 1803.	Eryngium aquaticum L., 1753.
Fœniculum vulgare Gaertn., 1788.	Fœniculum Fœniculum (L., 1753.) Karst.
Zizia integerrima DC. Or Pimpinella integrifolia B. & H.	Pimpinella integerrima (L.) A. Gray.
Leptocaulis patens Nutt. Or Apium patens S. Wats.	Apiastrum [Nutt., 1840] patens [Nutt.] Coulter & Rose.
Musenium, Nutt., 1840. (Odorium, Raf., 1825.)	Musinecon, Raf., 1820.
M. divaricatum Nutt.	M. divaricatum (Pursh) Nutt.
M. tenuifolium Nutt.	M. tenuifolium Nutt.
Anthriscus vulgaris Pers.	Anthriscus Anthriscus (L.) Karst.
Osmorhiza, Raf., 1818.	Washingtonia, Raf., 1818.
O. brevistylis DC., 1830.	W. Claytoni (Mx., 1803.) Britton.
O. longistylis DC.	W. longistylis (Torr.) Britton.
O. divaricata Nutt.	W. divaricata Britton.
Sium lineare Mx., 1803. And S. latifolium Auct. [Not L.]	Sium cicutæfolium Gmel., 1791,
Thaspium aureum var. apterum A. Gray.	Zizia aurea (L.) Koch.
Zizia aurea var. Bebbii C. & R.	Zizia Bebbii Coulter & Rose.
Thaspium trifoliatum var. apterum A. Gray, 1856.	Z. cordata (Walt., 1788.) D. C.
Cryptotænia, DC., 1829.	Deringa, Adans., 1763.
C. Canadensis DC.	D. Canadensis (L.) Kze.
Leptocaulis, DC., 1829.	Spermolepis, Raf., 1825.
L. divaricatus DC.	S. divaricatus (Walt.) Britton.
L. echinatus Nutt.	S. echinatus (Nutt.) Britton.
Discopleura, DC., 1829.	Ptilimnium, Raf., 1825.
D. capillacea DC.	P. capillaceum (Mx.) Hollick.
D. Nuttallii DC.	P. Nuttallii (DC.) Britton.
Sium angustifolium L., 1763.	Berula erecta (Huds., 1762.) Coville.
Hydrocotyle umbellata var. ambigua A. Gray, 1867. [Not H. ambigua Pursh, 1814.]	Hydrocotyle Canbyi C. & R., 1887.
H. interrupta Muhl., 1813.	H. verticillata Thunb., 1798.
H. repanda Reis., 1805.	Centella [L, 1763] Asiatica (L., 1753.) Urban.

CORNACEÆ.

Cornus sericea L., 1771.	Cornus Amonum Mill, 1768.
C. paniculata L'Her., 1788.	C. candidissima Marsh., 1785.
Nyssa multiflora Wang., 1787.	Nyssa sylvatica Marsh., 1735.
N. sylvatica var. biflora Sargent.	N. biflora Walt.
N. uniflora Wang., 1787.	N. aquatica L., 1753.

PYROLACEÆ. (*Ericaceæ in part*)

Pyrola rotundifolia var. uliginosa A. Gray.	Pyrola uliginosa Torr.
P. rotundifolia var. asarafolia Hook.	P. asarafolia Mx.

Current Names.	*Corrected Names.*
MONOTROPACEÆ. (*Ericaceæ in part.*)	
Schweinitzia, Nutt., 1818.	Monotropsis, Schwein, 1817.
S. odorata DC.	M. odorata Ell.
Monotropa Hypopitys L.	Hypopitys Hypopitys (L.) Small.
ERICACEÆ.	
Ledum latifolium Ait., 1789.	Ledum Grœnlandicum Oeder, 1771.
Azalea calendulacea Mx., 1803.	Azalea lutea L., 1753.
Menziesia ferruginea var. globularis Sims, 1813.	Menziesia pilosa (Mx., 1792.) Pers.
Leiophyllum, Pers., 1805. [Not Erhr., 1780.]	Dendrium, Desv., 1813.
L. buxifolium Desv.	D. buxifolium (Berg.) Desv.
Loiseleuria, Desv., 1813.	Chamæcistus, Oeder, 1761.
L. procumbens Desv.	C. procumbens (L.) Kze.
Andromeda floribunda Pursh.	Pieris [D. Don, 1834] floribunda (Pursh) B. & H.
A. nitida Bartram.	P. nitida (Bartram.) B. & H.
A. ligustrina Muhl. Or Lyonia [Nutt., 1818. Not Raf., 1817] ligustrina DC.	Xolisma [Raf., 1819] ligustrina (L.) Brit.
Cassandra, D. Don, 1834.	Chamædaphne, Moench, 1794.
C. calyculata Don.	C. calyculata (L.)
Arctostaphylos alpina Spreng. Or Arctous [Nied., 1890] alpina Nied.	Mairania [Neck., 1790] alpina (L.) Desv.
VACCINIACEÆ. (*Ericaceæ in part.*)	
Vaccinium myrtilloides Hook., 1834. [Not Mx., 1803.]	Vaccinium membranaceum Dougl., 1834.
V. tenellum Ait.	V. virgatum tenellum (Ait.) A. Gray.
V. corymbosum var. atrococcum A. Gray.	V. atrococcum (A. Gray.) Heller.
V. Pennsylvanicum var. nigrum Wood.	V. nigrum (Wood.) Britton.
V. corymbosum var. pallidum A. Gray.	V. pallidum Ait.
V. Oxycoccus L.	Oxycoccus Oxycoccus (L.) MacM.
V. macrocarpon Ait.	O. macrocarpus (Ait.) Pers.
V. erythrocarpon Ait.	O. erythrocarpus (Mx.) Pers.
PRIMULACEÆ.	
Samolus valerandi var. Americanus A. Gray, 1856.	Samolus floribundus H. B. K., 1817.
Lysimachia stricta var. producta A. Gray, 1878.	Lysimachia terrestris (L., 1753.) B. S. P.
L. ciliata L.	Steironema [Raf, 1820] ciliata (L.) Raf.
L. ciliata var. tonsa Wood.	S. tonsum (Wood.) Bicknell.
L. radicans Hook.	S. radicans (Hook). A. Gray.
L. lanceolatum Walt.	S. lanceolatum (Walt.) A. Gray.
L. longifolia Pursh, 1814.	S. quadriflorum (Sims., 1803.) Hitchcock.
PLUMBAGINACEÆ.	
Statice Limonium var. Caroliniana A. Gray.	Limonium Carolinianum (Walt.) Britton.
STYRACACEÆ.	
Halesia, Ellis, 1759. [Not P. Br., 1756.]	Mohrodendron, Brit., 1893.
H. tetraptera L., 1762.	M. Carolinum (L., 1759.) Britton.

Current Names.	*Corrected Names.*
OLEACEÆ.	
Fraxinus viridis Mx., 1813.	Fraxinus lanceolata Borck., 1800.
F. pubescens Lam., 1786.	F. Pennsylvanica Marsh., 1785.
F. platycarpa Mx., 1803.	F. Caroliniana Mill., 1768.
F. sambucifolia Lam., 1786.	F. nigra Marsh., 1785.
Forestiera, Poir., 1811.	Adelia, P. Br., 1756.
F. acuminata Poir.	A. acuminata Mx.
LOGANIACEÆ.	
Mitreola, R. Br., 1810.	Cynoctonum, J. G. Gmel., 1791.
M. petiolata [Walt., 1788.] T. & Gr.	C. mitreola (L., 1753.) Britton.
GENTIANACEÆ.	
Erythræa ramosissima Pers., 1787.	Erythræa pulchella (Sw., 1783.) Fries.
E. Douglassii A. Gray, 1876.	E. exaltata (Griseb., 1834.) Coville.
Sabbatia brachiata Ell., 1817.	Sabbatia angustifolia (Mx., 1803.) Britton.
S. calycosa [Mx., 1803.] Pursh.	S. calycina (Lam., 1786.) Heller.
S. gracilis Salisb., 1803.	S. campanulata (L., 1753.) Torr.
S. chloroides (Mx., 1803.) Pursh.	S. dodecandra (L., 1753.) B. S. P.
Gentiana quinqueflora Lam., 1786.	Gentiana quinquefolia L., 1753.
G. alba A. Gray, 1848. [Not Muhl., 1818.]	G. flavida A. Gray, 1846.
G. Saponaria var. linearis Griseb.	G. linearis Frœl.
G. linearis var. lanceolata A. Gray, 1878, and G. linearis var. latifolia A. Gray, 1887.	G. rubricaulis Schwein., 1824.
G. ochroleuca Frœl., 1796.	G. villosa L., 1753.
G. angustifolia Mx., 1803.	G. Porphyrio J. F. Gmel., 1791.
Halenia, Borck., 1796.	Tetragonanthus, S. G. Gmel., 1769.
H. deflexa Griseb.	T. deflexus (J. E. Smith.) Kze.
Bartonia tenella Willd., 1801.	Bartonia Virginica (L., 1753.) B. S. P.
MENYANTHACEÆ.	
Limnanthemum trachyspermum [Mx., 1803.] A. Gr.	Limnanthemum aquaticum (Walt., 1788.) Britton.
APOCYNACEÆ.	
Amsonia Tabernæmontana Walt., 1788.	Amsonia Amsonia (L., 1762.) Brit.
Apocynum cannabinum var. hypericifolia A. Gray.	Apocynum hypericifolia Ait.
A. cannabinum var. pubescens A. DC.	A. pubescens R. Br.
Fosteronia difformis A. DC. Or Echites difformis. Walt.	Trachelospermum difforme (Walt.) A. Gray.
ASCLEPIADACEÆ.	
Asclepias tuberosa var. decumbens Pursh.	Asclepias decumbens L.
A. pauperculata Mx., 1803.	A. lanceolata Walt., 1788.
A. incarnata var. pulchra Pers.	A. pulchra Erhr., 1798.
A. obtusifolia var. latifolia Torr.	A. latifolia (Torr.) Raf.
A. phytolaccoides Pursh, 1814.	A. exaltata (L., 1762.) Muhl.
A. Cornuti Decaisne. 1844.	A. Syriaca L., 1753.
A. verticillata var. pumila. A. Gray.	A. pumila (A. Gray.) Vail.
Acerates longifolia Ell., 1817.	A. Floridana (Lam., 1783.) Hitchc.
Enslenia, Mett., 1818. [Not Raf., 1817.]	Ampelanus, Raf., 1894.
E. albida Nutt.	A. albidus (Nutt.) Brit.
Vincetoxicum, Mœnch, 1794. [Not Walt., 1788.]	Cynanchum, L., 1753.

Current Names.	*Corrected Names.*
V. nigrum Mœnch.	C. nigrum (L.) Pers.
Gonolobus, Mich., 1803.	Vincetoxicum, Walt., 1788.*
G. suberosus R. Br.	V. suberosum (L.) Brit.
G. lævis var. macrophyllus A. Gray. Or G. macrophyllus Mx., 1803.	V. gonocarpus Walt., 1788.
G. lævis Mx., 1803.	V. gonocarpus lævis (Mx.) Brit.
G. hirsutus Mx.	V. hirsutum (Mx.) Brit.
G. obliquus R. Br. Or G. hirsutus Auct. [Not Mx.]	V. obliquum (Jacq.) Brit.
G Carolinensis R. Br.	V. Carolinense (Jacq.) Brit.
G. obliquus var. Shortii A. Gray.	V. Shortii (A. Gray.) Brit.
G. Baldwinianus Sweet.	V. Baldwinianum (Sweet.) Brit.

CONVOLVULACEÆ.

Dichondra repens Forst., 1786.	Dichondra evolvulacea (L., 1781.) Brit.
Bonamia humistrata A. Gray. Or Stylisma humistrata. Chapin	Breweria humistrata (Walt., 1788.) A. Gray.
Bonamia aquatica A. Gray. Or Stylisma aquatica Chapm.	Breweria aquatica (Walt.) A. Gray.
Bonamia Pickeringii A. Gray, 1867. Or Stylisma Pickeringii A. Gray, 1856.	Breweria Pickeringii (M. A. Curtis.) A. Gray.
Evolvulus argenteus Pursh, 1814. [Not R. Br., 1810.	Evolvulus pilosus Nutt., 1818.
Ipomœa Quamoclit L.	Quamoclit Quamoclit (L.) Brit.
L. coccinea L.	Q. coccinea (L.) Moench.
I. commutata R. & S., 1819.	Ipomœa Carolina (L, 1753.) Pursh.
Calystegia Sepium R. Br.	Convolvulus Sepium L.
C. Sepium var. pubescens A. Gray, 1867. Or Convolvulus Sepium var. repens A. Gray, 1878.	C. repens L.
Calystegia spithamea Pursh.	C. spithameus L.

CUSCUTACEÆ. (*Separated from Convolvulaceæ.*)

Cuscuta chlorocarpa Engelm., 1848.	Cuscuta Polygonorum Engelm., 1842.
C. decora Choisy, 1859.	C. indecora Choisy, 1841.
C. inflexa Engelm., 1859.	C. Coryli Engelm., 1842.
C. tenuiflora Engelm., 1848.	C. Cephalanthi Engelm., 1842.
C. glomerata Choisy, 1841. Or Lepidanche Compositarum Engelm., 1842.	C. paradoxa Raf., 1820.

POLEMONIACEÆ.

Phlox Carolina L., 1762.	Phlox ovata L., 1753.
P. Douglasii var. longifolia A. Gray. [Not P. longifolia Nutt.]	P. Douglasii Andicola Brit.
Collomia gracilis Dougl.	Gilia gracilis Hook.
C. longiflora A. Gray.	G. longiflora (Torr.) Don.
Gilia iberidifolia Benth.	Referred to G. congesta Hook.
Polemonium cœruleum A. Gray, 1863. [Not L., 1753.]	Polemonium Van Bruntiæ Brit., 1892.
Gilia linearis A. Gray.	Collomia linearis Nutt.
Gilia minima A. Gray.	Navarretia minima Nutt.

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* Heller gives Gonolobus suberosus, G. obliquus, G. Shortii and G. Baldwinianus.

Current Names.	*Corrected Names.*
HYDROPHYLLACEÆ.	
Ellisia, L., 1763. [Not L., 1759.]	Macrocalyx, Trew., 1761.
E. Nyctelea L.	M. Nyctelea (L.) Kze.
Phacelia parviflora Pursh, 1814.	Phacelia dubia (L., 1753.) Small.
P. parviflora var. hirsuta A. Gray.	P. hirsuta Nutt.
Hydrolea, L., 1762.	Nama, L., 1753.
H. affinis A. Gray.	N. affinis (A. Gray). Kze.
H. quadrivalvis Walt.	N. quadrivalvis (Walt.) Kze.
H. ovata Nutt.	N. ovata (Nutt.) Brit.
BORAGINACEÆ.	
Echinospermum, Sw., 1818.	Lappula, Mœnch, 1794.
E. Lappula Lehm.	Lappula Lappula (L.) Karst.
E. Redowskii var. cupulatum A. Gray, 1876.	L. Texana (Scheele, 1852.) Brit.
E. Virginicum Lehm. Or Cynoglossum Morrisoni DC., 1846.	L. Virginiana (L., 1753.) Greene.
Echinospermum floribundum Lehm.	L. floribunda (Lehm.) Greene.
E. deflexum var. Americanum A. Gray.	L. Americana (A. Gray.) Rydberg.
Eritrichium Californicum var. subglochidiatum A. Gr. (in part), 1876.	Allocarya scopulorum Greene, 1887.
Krynitzkia, F. & M., 1841.	Cryptanthe, Lehm., 1832 (in part).
K. crassisepala A. Gray.	C. crassisepala (Tor. & Gr.) Greene.
K. Fendleri A. Gray.	C. Fendleri (A. Gray.) Greene.
K. Jamesii [Torr., 1853.] A. Gray.	Oreocarya suffruticosa (Torr., 1827.) Greene.
K. glomerata A. Gray. Or Eritrichium glomeratum DC.	Oreocarya glomerata (Pursh) Greene.
K. sericea A. Gray.	O. sericea (A. Gray.) Greene.
Eritrichium fulvocanescens A. Gray.	O. fulvocanescens (A. Gray.) Greene.
Mertensia maritima S. F. Gray.	Pneumaria maritima (L.) Hill.
Myosotis palustris var. laxa A. Gray.	Myosotis laxa Lehm.
M. verna Nutt., 1818.	M. Virginica (L., 1753.) B. S. P.
Lithospermum hirtum Lehm., 1818.	Lithospermum Gmelini (Mx., 1803.) Hitchc.
Onosmodium Carolinianum var. molle A. Gray.	Onosmodium molle Mx.
VERBENACEÆ.	
Verbena Aubletia Jacq., 1772.	Verbena Canadensis (L., 1767.) Brit.
Lippia nodiflora Mx.	Distinct from Lippia lanceolata Mx.
LABIATÆ.	
Isanthus cœruleus Mx., 1803.	Isanthus brachiatus (L., 1753.) B. S. P.
Scutellaria canescens Nutt., 1818.	Scutellaria incana Muhl., 1813.
S. versicolor Nutt., 1818.	S. cordifolia Muhl., 1813.
S. Wrightii A. Gray, 1872.	S. resinosa Torr., 1827.
S. parvula var. mollis A. Gr., 1878. [Not S. Mollis R. Br.]	S. campestris Britton, 1894.
S. resinosa A. Gray, 1878. [Not Torr., 1827.]	S. Brittoni Porter, 1894.
Lophanthus, Benth., 1829. [Not Adans., 1763.] Or Vleckia, Raf., 1808.	Agastache,* Clayt., 1762.

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* Heller gives these species as Vleckia.

Current Names.	*Corrected Names.*
Lophanthus nepetoides Benth.	A. nepetoides (L.) Kze.
L. scrophulariæfolius Benth.	A. scrophulariæfolia (Willd.) Kze.
L. anisatus (Nutt., 1818.) Benth.	A. anethiodora (Nutt., 1813.) Brit.
Cedronella cordata Benth.	Meehania [Brit., 1894] cordata (Nutt.) Brit.
Nepeta Glechoma Benth., 1834.	Glechoma hederacea L., 1753.
Brunella vulgaris var. pinnatifida Benth., 1848.	Prunella laciniata L., 1763.
Physostegia Virginiana var. denticulata A. Gray.	Physostegia denticulata (Ait.) Brit.
Stachys hyssopifolia var, ambigua A. Gray.	Stachys ambigua (A. Gray.) Brit.
S. palustris var. glabra [Ridd., 1836.] A. Gray.	S. tenuifolia Willd., 1801.
S. palustris var. aspera A. Gray.	S. aspera Mx.
S. palustris var. cordata A. Gray.	S. cordata Riddell.
S. Betonica Benth., 1834.	Betonica officinalis L., 1753.
Salvia azurea var. grandiflora Benth., 1848.	Salvia Pitcheri Torr., 1833.
Monarda fistulosa var. rubra A. Gray. Or M. fistulosa var. media A. Gray.	Monarda media Willd.
M. fistulosa, var. mollis Benth., 1833. (In part.)	M. scabra Beck., 1826.
Calamintha, Mœnch, 1794.	Clinopodium, L., 1753.
C. Clinopodium Benth., 1848.	C. vulgare L., 1753.
C. Nepeta Link.	C. Nepeta (L.) Kze.
C. officinalis Mœnch, 1794.	C. Calamintha (L., 1753.) Kze.
C. glabella var. Nuttallii A. Gray, 1856.	C. glabrum (Nutt., 1818.) Kze.
C. glabella Benth.	C. glabellum (Mx.) Kze.
Pycnanthemum, Mx., 1803, and Brachystemon, Mx., 1803.	Koellia, Moench, 1794.
Pycnanthemum linifolium Pursh, 1814.	K. flexuosa (Walt., 1788.) MacM.
P. lanceolatum Pursh, 1814.	K. Virginiana (L., 1753.) MacM.
P. pilosum Nutt; or, P. muticum var. pilosum A. Gray.	K. pilosa (Nutt.) Brit.
P. Torreyi Benth., 1834.	K. verticillata (Mx., 1803.) Kze.
P. clinopodioides Tor. & Gr.	K. clinopodioides (T. & G.) Kze.
P. aristatum var. hyssopifolium A. Gray.	K. hyssopifolia (Benth.) Brit.
P. aristatum Mx.	K. aristatum (Mx.) Kze.
P. incanum Mx.	K. incana (L.) Kze.
P. Tullia Benth., 1834.	K. pycnanthemoides (Leavenw., 1830.) Kze.
P. albescens Tor. & Gr.	K. albescens (T. & Gr.) Kze.
P. muticum Pers.; or, Brachystemon muticum Mx.	K. mutica (Mx.) Kze.
P. montanum Mx.	K. montana (Mx.) Kze.
Cunila Mariana L., 1759; or, Hedyosmos (1891) origanoides Kze.	Cunila origanoides (L., 1753.) Brit.*
Lycopus Europæus var. sessilifolius A. Gray	Lycopus sessilifolius A. Gray.
L. Europæus var. integrifolius A. Gray, 1867.	L. rubellus Moench, 1802.

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* Heller gives C. Mariana L.

Current Names.	*Corrected Names.*
L. Europæus var. sinuatus A. Gray, 1867.	L. Americanus Muhl., 1815.
L. lucidus var. Americanus A. Gr.	Included in L. lucidus Turcz.
Mentha viridis L., 1763.	Mentha spicata L., 1753.
M. sylvestris L., 1763.	M. longifolia (L., 1753.) Huds.
M. aquatica var. crispa Benth.	M. crispa L.
M. Canadensis var. glabrata Benth.	Included in M. Canadensis L.
Perilla ocimoides L., 1764.	Perilla frutescens (L., 1753.) Brit.
SOLANACEÆ.	
Nicandra physaloides Gærtn.	Physalodes Physalodes (L.) Brit.
Physalis pubescens Auct. [Not L., 1753.]	Physalis pruinosa L., 1753.
P. angulata Rz. & Pav., 1799. [Not L., 1753.]	P. lanceifolia Nees, 1831.
P. lanceolata var. lævigata A. Gray, 1874.	P. longifolia Nutt., 1833.
P. Pennsylvanica var. lanceolata A. Gray, 1867.	P. lanceolata Mx., 1803.
P. Pennsylvanica A. Gr., 1867. [Not L., 1753.] Or P. lanceolata. Auct. [Not Mx., 1803.]	P. Virginiana Mill., 1768.
P. viscosa Pursh, 1814. [Not L., 1753.] Or P. Virginiana. A. Gray, 1878. [Not Mill., 1768.]	P. heterophylla Nees, 1831.
P. Virginiana var. ambigua A. Gray.	P. heterophylla ambigua (A. Gr.) Rydberg.
P. nyctaginea Dunal.	P. heterophylla nyctaginea (Dunal.) Rydberg.
P. Pennsylvanica L., 1763.	P. viscosa L., 1753.
P. lobata Torr.	Quincula [Raf., 1832.] lobata (Torr.) Raf.
P. grandiflora Hook.	Leucophysalis [Rydb., 1896.] grandiflora (Hook.) Rydberg.
Solanum conioides Moricand.	Chamæsaracha [A. Gr., 1876.] conioides, (Moric.) Brit.
S. Coronopus Dunal.	C. Coronopus (Dunal.) A. Gray.
S. Lycopersicum L., 1753. Or Lycopersicum esculentum Mill., 1768.	Lycopersicon Lycopersicon (L.) Kaest.
Petunia nyctaginiflora Juss., 1803.	Petunia axillaris (Lam., 1797.) B. S. P.
SCROPHULARIACEÆ.	
Linaria Cymbalaria Mill.	Cymbalaria Cymbalaria (L.) Wettst.
Elatine, Mœnch, 1794. [Not L., 1753.]	Elatinoides, Wettst., 1891.
Linaria Elatine Mill.	E. Elatine (L.) Wettst.
L. spuria Mill.	E. spuria (L.) Wettst.
L. vulgaris Mill., 1768.	Linaria Linaria (L., 1753.) Karst.
Scrophularia nodosa var. Marylandica A. Gray. Or S. nodosa Auct. [Not L.]	Scrophularia Marylandica L.
Penstemon pubescens Solander, 1789.	Penstemon hirsutus (L., 1753.) Willd.
P. lævigatus var. canescens Brit., 1890.	P. canescens Brit., 1894.
P. lævigatus var. Digitalis A. Gray.	P. Digitalis (Sweet.) Nutt.
P. lævigatus Solander, 1789.	P. Penstemon (L., 1753.) Brit.
P. cœruleus Nutt., 1818.	P. angustifolius Pursh, 1814.
Paulownia imperialis Sieb. & Zucc., 1835.	Paulownia tomentosa (Thunb., 1784.) Baill.

Current Names.	*Corrected Names.*
Herpestis Moniera H. B. K.	Moniera Moniera (L.) Brit.
H. nigrescens Benth., 1835.	M. acuminata (Walt., 1788.) Kze.
H. amplexicaulis Pursh, 1814.	M. Caroliniana (Walt., 1788.) Kze.
H. rotundifolia Pursh, 1814.	M. rotundifolia Mx., 1803.
Micranthemum Nuttallii A. Gray, 1867.	Micranthemum micranthemoides (Nutt., 1817.) Wettst.
Limosella aquatica var. tenuifolia Nutt.	Limosella tenuifolia Hoffm.
Synthyris, Benth., 1846.	Wulfenia, Jacq., 1781.
S. Houghtoniana Benth.	W. Houghtoniana (Benth.) Greene.
S. rubra Benth.	W. rubra (Hook.) Greene.
Veronica Anagallis L.	Veronica Anagallis-aquatica L.
V. Buxbaumii Tenore, 1811.	V. Byzantina (Sibth. & Sm., 1806.) B. S. P.
V. Virginica L.	Leptandra Virginica (L.) Nutt.
Seymeria, Pursh, 1814.	Afzelia, J. G. Gmel., 1796.
S. macrophylla Nutt.	A. macrophylla (Nutt.) Kze.
Gerardia Pedicularia L.	Dasystoma Pedicularia (L.) Benth.
G. flava L., 1753. Or Dasystoma pubescens Benth., 1846.	D. flava (L.) Wood.
G. grandiflora Benth.	D. grandiflora (Benth.) Wood.
G. integrifolia [Benth., 1846.] A. Gray. Or Dasystoma quercifolia var. integrifolia Benth.	D. lævigata Raf., 1820.
G. purpurea var. paupercula A. Gray. Or G. intermedia Porter, 1878.	D. paupercula (A. Gr.) Brit.
G. tenuifolia var. macrophylla Benth. [Not G. macrophylla Benth.]	Gerardia Besseyana Brit., 1894.
G. parvifolia Chapm., 1860.	G. Skinneriana Wood, 1847.
Castilleia pallida var. septentrionalis [Loud., 1825.] A. Gray.	Castilleia acuminata (Pursh, 1814.) Spreng.
Melampyrum Americanum Mx., 1803.	Melampyrum lineare Lam., 1797.

LENTIBULACEÆ.

Utricularia subulata var. cleistogama A. Gray.	Utricularia cleistogama (A. Gray.) Brit.
U. striata Le Conte, 1824.	U. fibrosa Walt., 1788.

OROBANCHACEÆ.

Aphyllon, G. Gray, 1848. Or Anoplanthus, Endl., 1838.	Thalesia, Raf., 1818.
Aphyllon uniflorum Tor. & Gr.	T. uniflora (L., 1753.) Brit.
A. fasciculatum A. Gr.	T. fasciculata (Nutt.) Brit.
A. Ludovicianum A. Gray. Or Phelipæa Ludoviciana Don.	Orobanche Ludoviciana Nutt.
Epifagus, (Epiphegus.) Nutt., 1818.	Leptamnium, Raf. Feb., 1818.
E. Virginiana Bart.	L. Virginianum (L.) Raf.

BIGNONIACEÆ.

Bignonia capreolata L., 1753.	Bignonia crucigera L., 1753.
Catalpa bignonioides Walt., 1788.	Catalpa Catalpa (L., 1753.) Karst.

MARTYNIACEÆ. (*Separated from Bignoniaceæ.*)

Martynia proboscidea Glox., 1785.	Martynia Louisiana Mill., 1768.

ACANTHACEÆ.

Ruellia oblongifolia Mx. Or Dipteracanthus oblongifolius Chapm.	Calophanes oblongifolia (Mx.) Don.

Current Names.	*Corrected Names.*
Dipteracanthus strepens Nees.	Ruellia strepens L.
D. ciliosus Nees.	R. ciliosa Pursh.
D. micranthus Eng. &. Gr., 1845. Or Ruellia strepens var. cleistantha A. Gray.	R. strepens micrantha (Eng. & Gr.) Brit.
D. ciliosus var. parviflorus Nees, 1842. Or Ruellia ciliosa var. ambigua A. Gray, 1878.	R. ciliosa parviflora (Nees) Brit.
Dicliptera, Juss., 1807.	Diapedium, Konig, 1806.
D. brachiata Spreng.	D. brachiatum (Pursh) Kze.
PHRYMACEÆ. (*Separated from Verbenaceæ.*)	
PLANTAGINACEÆ.	
Plantago glabra Nutt., 1818. (?)	Plantago eriopoda Torr., 1827.
P. Patagonica var. gnaphalioides A. Gray, 1856.	P. Purshii R. & S., 1818.
P. Patagonica var. aristata A. Gray, 1856.	P. aristata Mx., 1803.
P. pusilla Nutt., 1818.	P. elongata Pursh, 1814.
Littorella lacustris L., 1771.	Littorella uniflora (L., 1753.) Rusby.
RUBIACEÆ.	
Oldenlandia cœrulea A. Gray.	Houstonia cœrulea L.
O. serpyllifolia A. Gray.	H. serpyllifolia Mx.
O. minima A. Gray.	H. minima Beck.
O. purpurea A. Gray.	H. purpurea L.
Houstonia purpurea var. ciliolata A. Gray.	H. ciliata Torr.
H. purpurea var. longifolia A. Gray.	H. longifolia Gærtn.
H. purpurea var. tenuifolia A. Gray.	H. tenuifolia Nutt.
Oldenlandia angustifolia A. Gray.	H. angustifolia Mx.
O. glomerata Mx., 1803.	Oldenlandia uniflora L., 1753.
Galium Anglicum Huds., 1778.	Galium Parisiense L., 1753.
G. Aparine var. Vaillantii [DC., 1805.] Koch.	G. spurium L., 1753.
G. circæzans var. montanum T. & G., 1841.	G. Kamtschaticum Steller, 1827.
G. trifidum var. tinctorium Or G. trifidum var. latifolium Torr., 1826.	G. tinctorium L., 1753.
G. trifidum var. pusillum A. Gray.	G. trifidum L.
G. trifidum var. bifolium Macoun, 1884.	G. palustre L., 1753.
CAPRIFOLIACEÆ.	
Viburnum lantanoides Mx., 1803.	Viburnum alnifolium Marsh., 1785.
V. nudum var. cassinoides T. & Gr.	V. cassinoides L.
V. nudum var. Claytoni T. & Gr.	V. nudum L.
V. prunifolium var. ferrugineum T. & Gr., 1841. [Not V. ferrugineum Raf., 1838.]	V. rufotomentosum Small, 1896.
Symphoricarpus racemosus var. pauciflorus Robbins.	Symphoricarpus pauciflorus (Robbins.) Brit.
S. vulgaris Mx., 1803.	S. Symphoricarpus (L., 1753.) MacM.
Lonicera grata Ait., 1789.	L. Caprifolium L., 1753.
L. parviflora var. Douglasii DC. [Not Caprifolium Douglasii, Lind.]	L. glaucescens Rydberg, 1897.
L. parviflora Lam., 1783.	L. dioica L., 1767.
Diervilla trifida Mœnch, 1794.	Diervilla Diervilla (L., 1753.) MacM.

Current Names.	*Corrected Names.*
ADOXACEÆ. (*Separated from Caprifoliaceæ.*)	
VALERIANACEÆ.	
Fedia olitoria Vahl.	Valerianella Locusta (L., 1753.) Bettke.
Fedia Fagopyrum T. & Gr., 1841.	V. chenopodifolia (Pursh, 1814.) DC.
F. stenocarpa Engelm.	V. stenocarpa (Engelm.) Krok.
F. Woodsiana T. & Gr.	V. Woodsiana (T. & Gr.) Walp.
F. umbilicata Sullivant.	V. Woodsiana umbilicata (Sulliv.) A. Gray.
F. patellaria Sullivant.	V. Woodsiana patellaria (Sulliv.) A. Gray.
F. longiflora T. & Gr.	V. longiflora (T. & Gr.) Walp.
CUCURBITACEÆ.	
Cucurbita perennis [James, 1823.] A. Gray,	Cucurbita fœtidissima H. B. K., 1817.
Echinocystis, T. & Gr., 1840.	Micrampelis, Raf., 1808.
E. lobata Tor. & Gr.	M. lobata (Mx.) Greene.
Discanthera dissecta T. & Gr.	Cyclanthera dissecta (T. & Gr.) Arn.
CAMPANULACEÆ.	
Campanula flexuosa Mx.	Included in C. divaricata Mx.
Specularia, Heist., 1830.	Legouzia, Durand, 1782.
S. biflora A. Gray.	L. biflora (R. & P.) Brit.
S. perfoliata A. D. C.	L. perfoliata (L.) Brit.
S. leptocarpa A. Gray.	L. leptocarpa (Nutt.) Brit.
CICHORIACEÆ. (*Separated from Compositæ.*)	
Apogon, Ell., 1824.	Serinia, Raf., 1817.
A. humilis Ell., 1824.	S. oppositifolia (Raf., 1817.) Kze.
Krigia, Schreb., 1791.	Adopogon, Neck., 1790.
Cynthia Virginica Don.	A. Virginianum (L.) Kze.
C. Dandelion DC. Or Krigia Dandelion Nutt.	A. Dandelion (L.) Kze.
K. occidentalis Nutt.	A. occidentale (Nutt.) Kze.
K. Virginica Willd., 1804. And K. Caroliniana Nutt.	A. Carolinianum (Walt., 1788.) Brit.
Stephanomeria, Nutt., 1841.	Ptiloria, Raf., 1832.
S. runcinata Nutt., 1841.	P. pauciflora (Torr., 1827.) Raf.
S. minor [Hook., 1833.] Nutt.	P. tenuifolia (Torr., 1828.) Raf.
Leptoseris sonchoides Nutt.	Malacothrix sonchoides (Nutt.) T. & Gr.
Taraxacum Dens leonis Desf., 1800. Or T. officinale Weber, 1780.	Taraxacum Taraxacum (L., 1753.) Karst.
Lactuca elongata Muhl., 1804.	Lactuca Canadensis L., 1753.
L. elongata var. sanguinea [Bigel., 1824.] T. & Gr.	L. hirsuta Muhl., 1813.
L. elongata var. integrifolia [Bigel., 1824.] T. & Gr. [Not L. integrifolia Nutt., 1818.]	L. sagittæfolia Ell., 1821–24.
L. integrifolia Nutt., 1818. Or Mulgedium pulchellum Nutt.?	L. pulchella (Pursh, 1814.) DC.
L. acuminata A. Gray, 1883. Or Mulgedium acuminatum DC.	L. villosa Jacq., 1798.
Mulgedium Floridanum DC.	L. Floridana (L.) Gærtn.
M. leucophæum DC., 1838. Or Lactuca leucophæa A. Gray.	L. spicata (Lam., 1789.) Hitchc.

Current Names.	*Corrected Names.*
Lygodesmia juncea var. rostrata A. Gray.	Lygodesmia rostrata A. Gray.
Troximon, Nutt., 1813. [Not Gaertn., 1791.]	Agoseris, Raf., 1817.
T. glaucum Nutt.	A. glauca (Pursh.) Greene.
T. glaucum var. parviflorum A. Gray.	A. parviflora (Nutt.) Greene.
T. cuspidatum Pursh.	Nothocalais [Greene, 1886.] cuspidata (Pursh) Greene.
Pyrrhopappus, DC., 1838.	Sitilias, Raf., 1836.
P. Carolinianus DC.	S. Caroliniana (Walt.) Raf.
P. scaposus DC., 1838. Or P. grandiflorus Auct.	S. grandiflora (Nutt., 1834.) Greene.
Hieracium Marianum var. spathulatum A. Gray, 1886. [Not H. spathulatum Scheele, 1863.	Hieracium Greenii Porter & Brit.
Nabalus Fraseri DC., 1838.	Nabalus* Serpentarius (Pursh, 1814.) Hook.
Prenanthes Serpentaria var. nana A. Gray.	N. nanus (Bigel.) D. C.

AMBROSIACEÆ. (*Separated from Compositæ.*)

Franseria, Cav., 1793.	Gærtneria, Med., 1785.
F. Hookeriana Nutt., 1841.	G. acanthicarpa (Hook., 1833.) Brit.
F. discolor Nutt.	G. discolor (Nutt.) Kze.
F. tomentosa A. Gray.	G. tomentosa (A. Gray.) Kze.
Xanthium echinatum Murr., 1783.	Xanthium Canadense Mill., 1768.

COMPOSITÆ.

Vernonia Noveboracensis var. latifolia A. Gray, 1884.	Vernonia glauca (L., 1753.) Brit.
V. altissima var. grandiflora A. Gray. [Not V. grandiflora Less., 1831.]	V. Drummondii Shuttelw., 1894.
V. Jamesii T. & Gr., 1841.	V. marginata (Torr., 1827.) Brit.
V. altissima Nutt., 1818. Or V. fasciculata var. altissima T. & Gr.	V. gigantea Walt., 1788.
Sclerolepis verticillata Cass., 1827.	Sclerolepis uniflora (Walt., 1788.) Porter.
Eupatorium fœniculaceum Willd., 1804. Or E. fœniculoides Walt., 1788.	Eupatorium capillifolium (Lam., 1783.) Small.
E. hyssopifolium var. laciniatum A. Gray, 1884.	E. Torreyanum Short., 1836.
E. tenuifolium Willd., 1804.	E. verbenæfolium Mx., 1803.
Conoclinium cœlestinum DC.	E. cœlestinum L.
Mikania, Willd., 1804.	Willoughbæa, Neck., 1790.
M. scandens Willd.	W. scandens (L.) Kze.
Brickellia, Ell., 1824.	Coleosanthus, Cass., 1817.
B. grandiflora Nutt.	C. grandiflorus (Hook.) Kze.
Kuhnia eupatoroides var. corymbulosa T. & Gr., 1841.	Kuhnia glutinosa Ell., 1821–24.
Liatris, Schreb., 1791.	Lacinaria, Hill., 1762.
L. squarrosa Willd.	L. squarrosa (L.) Hill.
L. graminifolia Willd., 1804. Or L. cylindracea Mx., 1803.	L. cylindracea (Mx.) Kze.

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* Heller (as also Gray) gives all species of Nabalus as Prenanthes.

Current Names.	*Corrected Names.*
L. elegans Willd.	L. elegans (Walt.) Kze.
L. punctata Hook.	L. punctata (Hook.) Kze.
L. acidota Engelm. & Gr.	L. acidota (Eng. & Gr.) Kze.
L. pycnostachya Mx.	L. pycnostachya (Mx.) Kze.
L. scariosa Willd.	L. scariosa (L.) Hill.
L. spicata Willd.	L. spicata (L.) Kze.
L. spicata var. montana A. Gr., 1884.	L. spicata pumila (Lodd., 1821.) Porter.
L. graminifolia Pursh, 1814. [Not Willd., 1804.]	L. graminifolia (Walt., 1788.) Kze.
L. graminifolia var. dubia A. Gray, 1856.	L. graminifolia pilosa (Ait., 1789.) Brit.
L. odoratissima Willd.	Trilisa [Cass., 1818] odoratissima (Walt.) Cass.
L. paniculata Willd.	T. paniculata (Walt.) Cass.
Gutierrezia Euthamiæ Tor. & Gr., 1841.	Gutierrezia Sarothræ (Pursh, 1814.) Brit.
Chrysopsis gossypina Nutt., 1818.	Chrysopsis pilosa (Walt., 1788.) Brit.
C. villosa var. stenophylla A. Cray.	C. stenophylla (A. Gray.) Greene.
C. villosa var. hispida A. Gray.	C. hispida (Hook.) Nutt.
Bigelowia DC., 1833. [Not Bigelovia. Spreng., 1821.]	Chondrophora, Raf., 1836.
Bigelovia nudata DC.	C. nudata (Mx.) Brit.
B. graveolens [Nutt., 1818.] A. Gray.	Chrysothamnus [Nutt., 1840] nauseosus (Pursh, 1814.) Brit.
B. Howardi A. Gray. Or Linosyris Howardi Parry.	C. Howardi (Pavy.) Greene.
Bigelovia Engelmanni A. Gray.	Oonopsis [Greene, 1896.] Engelmanni (A. Gray.) Greene.
Aplopappus ciliatus DC. Or Donia ciliata Nutt.	Prionopsis [Nutt., 1841] ciliata Nutt.
Aplopappus Nuttallii T. & Gr., 1842.	Eriocarpum [Nutt., 1841] grindelioides Nutt., 1841.
A. rubiginosus Tor. & Gr.	E. rubiginosum (T. & Gr.) Brit.
A. spinulosus DC.	E. spinulosum (Nutt.) Greene.
A. armerioides A. Gray.	Stenotus [Nutt., 1841] armerioides Nutt.
A. divaricatus A. Gray.	Isopappus [T. & Gr., 1841] divaricatus Nutt.
Solidago bicolor var. concolor T. & Gr., 1841.	Solidago hispida Muhl., 1804.
S. speciosa var. angustata T. & Gr., 1841.	S. erecta Pursh, 1814.
S. speciosa var. angustata A. Gray, 1884. (in part).	S. rigidiuscula (T. & Gr., 1841.) Porter.
S. thyrsoidea E. Meyer, 1830.	S. macrophylla Pursh, 1814.
S. virgata Mx., 1803.	S. stricta Ait., 1789.
S. Virgaurea var. alpina Bigel., 1824.	S. alpestris Wald. & Kit., 1812.
S. humilis var. Gillmani A. Gray.	S. Virgaurea Gillmani (A. Gray.) Porter.
S. altissima Ait., 1789.	S. rugosa Mill., 1768.
S. pilosa Walt., 1788. [Not Mill., 1768.]	S. fistulosa Mill., 1768.
S. elliptica Ell., 1824. [Not Ait., 1789.]	S. Elliottii T. & Gr., 1841.
S. neglecta var. linoides [T. & Gr, 1841.] A. Gray.	S. uniligulata (DC., 1836.) Porter.
S. arguta T. & Gr., 1841. [Not Ait., 1789.]	S. juncea Ait., 1789.
S. Muhlenbergii Tor. & Gr., 1841.	S. arguta Ait., 1789.

Current Names.	*Corrected Names.*
S. gigantea Ait., 1789.	S. serotina gigantea (Ait.) A. Gray.
S. gigantea Willd., 1804. [Not Ait., 1789.]	S. serotina Ait., 1789.
S. Canadensis var. scabra T. & Gr. [Not S. scabra Willd., 1804.]	S. Canadensis scabriuscula Porter, 1894.
S. memoralis var. incana [T. &. Gr., 1841.] A. Gray.	S. mollis Bartl., 1836.
S. lanceolata L., 1767.	Euthamia [Nutt., 1818] graminifolia (L., 1753.) Nutt.
S. leptocephala T. & Gr.	E. leptocephala (T. & Gr.) Greene.
S. tenuifolia Pursh, 1814.	E. Caroliniana (L., 1753.) Greene.
S. cordata Short, 1834.	Brachychæta [T. & Gr., 1841] sphacelata (Raf., 1820.) Brit.
Aphanostephus Arkansanum A. Gray, 1852.	Aphanostephus skirrobasis (DC., 1836.) Trelease.
Townsendia sericea Hook., 1834	Townsendia exoscapa (Richards, 1823.) Porter.
Sericocarpus solidagineus Nees, 1832.	Sericocarpus linifolius (L., 1753.) B. S. P.
S. tortifolius [Mx., 1803.] Nees.	S. bifoliatus (Walt., 1788.) Porter.
S. conyzoides Nees, 1832.	S. asteroides (L., 1753.) B. S. P.
Aster corymbosus Ait., 1789.	S. divaricatus L., 1753.
A. cordifolius var. lævigatus Porter. [Not A. lævigatus Lam.]	Aster Lowrieanus Porter, 1894.
A. cordifolius var. lanceolatus Porter, 1889. [Not A. lanceolatus Willd.]	A. Lowrieanus lancifolius Porter, 1894.
A. cordifolius var. incisus Brit., 1892. [Not A. incisus Fisch., 1812.]	A. Lowrieanus Bicknellii Porter, 1894.
A. patens var. phlogifolius Nees.	A. phlogifolius Muhl.
A. oblongifolius var. rigidulus A. Gray.	A. oblongifolius Nutt.
A. puniceus var. lævicaulis A. Gray, 1884.	A. puniceus firmus (Nees) T. & Gr.
A. virgatus Ell., 1824. [Not Moench, 1802.]	A. purpuratus Nees, 1832.
A. carneus Tor. & Gr., 1841.	A. salicifolius Lam., 1783.
A. carneus var. ambiguus T. & Gr., 1841. [Not A. ambiguus Thb., 1832.]	A. paniculatus acutidens Burgess, 1898.
A. ericoides var. pusillus A. Gray, 1884. [Not A. pusillus Horn, 1815.]	A. ericoides depauperatus Porter, 1894.
A. ericoides var. Pringlei A. Gray, 1884.	A. Pringlei (A. Gray.) Britton.
A. miser Nutt., 1818. Or A. diffusus Ait., 1789.	A. lateriflorus (L., 1753.) Brit.
A. diffusus var. thyrsoideus A. Gray.	A. lateriflorus thyrsoideus (A. Gray.) Sheldon.
A. diffusus var. bifrons [Lindl., 1836, not All., 1785.] A. Gr.	A. lateriflorus grandis Porter, 1894.
A. Tradescanti T. & Gr., 1841. [Not L., 1753.	A. vimineus Lam., 1783.
A. commutatus [T. & Gr., 1841.] A. Gray.	A. incanopilosus (Lind., 1836.) Sheldon.
A. divaricatus T. & Gr., 1841. [Not L., 1753.	A. exilis* Ell., 1824.

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* The following new species of Aster, all credited to Burgess, are described: A. carmesinus, A. tenebrosus, A. furcatus, A. Claytoni, A. curvescens, A. roscidus, A. ianthinus, A. violaris, A. multiformis,

Current Names.	*Corrected Names.*
A. linifolius. T. & Gr., 1841. [Not L., 1753.]	A. subulatus. Mx., 1803.
A. ericæfolius Rothrock, 1877.	Leucelene [Greene, 1896] ericoides (Tor., 1828.) Greene.
A. [Conyzopsis] angustus T. & Gr.	Brachyactis [Ledeb., 1846] angustus (Lindl.) Brit.
A. tenacetifolius H. B. K.	Machæranthera [Nees, 1832] tanacetifolia (H. B. K.) Nees.
A. canescens Pursh. (in part).	M. sessiliflora (Nutt.) Greene.
Erigeron glabellum Nutt., 1818.?	Erigeron asper Nutt., 1818.
E. glabellus var. mollis A. Gray, 1863. [Not E. mollis Don, 1802.]	E. subtrinervis Rydberg, 1894.
E. bellidifolius Muhl., 1804.	E. pulchellus Mx., 1803.
E. strigosum Muhl., 1804.	E. ramosus (Walt., 1788.) B. S. P.
E. Canadense L.	Leptilon [Raf., 1818] Canadense (L.) Brit.
E. divaricatum Mx.	L. divaricatum (Mx.) Raf.
Diplopappus umbellatus Hook.	Dœllingeria [Nees, 1832] umbellata (Mill.) Nees.
Aster umbellatus var. pubens A. Gray.	D. umbellata pubens (A. Gray.) Brit.
Diplopappus amygdalinus Nees, 1832. Or Aster umbellatus var. latifolius A. Gr., 1884.	D. humilis (Willd., 1804.) Brit.
Diplopappus cornifolius Less., 1837.	D. infirma (Mx., 1803.) Greene.
D. linariifolius Hook.	Ionactis [Greene, 1897] linariifolius. (L.) Greene.
Baccharis angustifolia Mx. (in part.)	Baccharis neglecta Brit., 1898.
Evax, Gærtner, 1791.	Filago, L., 1753.
E. prolifera Nutt.	F. prolifera (Nutt.) Brit.
Filago, L., 1758. [Not L., 1753.]	Gifola, Cass., 1819.
F. Germanica L.	G. Germanica (L.) Dumort.
Pluchea bifrons DC., 1836.	Pluchea fœtida (L., 1753.) B. S. P.
P. fœtida DC., 1830.	P. petiolata Cass., 1826.
Antennaria margaritacea Hook.	Anaphalis [DC., 1837] margaritacea (L.) Benth. & Hook.
Gnaphalium polycephalum Mx., 1803.	Gnaphalium obtusifolium L., 1753.
Zinnia, L, 1759.	Crassina, Scepin, 1758.
Z. grandiflora Nutt.	C. grandiflora (Nutt.) Kze.
Heliopsis laevis Pers., 1807.	Heliopsis helianthoides (L., 1753.) B. S. P.
H. laevis var. scabra Tor. & Gr.	H. scabra Dunal.
Eclipta procumbens Mx., 1803.	Eclipta alba (L., 1753.) Hassk.
Lepachys, Raf., 1819.	Ratibida, Raf., 1818.
L. pinnata Tor. & Gr.	R. pinnata (Vent.) Barnh.
L. columnaris Tor. & Gr.	R. columnaris (Sims.) D. Don.
L. Tagetes A. Gray.	R. Tagetes (James.) Barnh.
Echinacea, Moench, 1794.	Brauneria, Neck., 1790.

A. nobilis, also the following new varieties: A. divaricatus cymulosus, centifolius, deltoideus, persaliens and fontinalis, A. curvescens umbelliformis, and oviformis, A. macrophyllus velutinus, sejunctus, apricensis, biformis, pinguifolius and excelsior, A. cordifolius alvearius and pedicellatus, A. sagittifolius dissitiflorus and urophyllus, A. undulatus abruptifolius, loriformis, torquatus and triangularis, A. lævis Potomacensis, A. Novi Belgii Atlanticus and Brittonii, A. ericoides parviceps.

Current Names.	*Corrected Names.*
E. purpurea Moench.	B. purpurea (L.) Brit.
E. angustifolia DC., 1836.	B. pallida (Nutt., 1834.) Brit.
Helianthus petiolaris var. canescens A. Gr., 1852. Not H. canescens Mx., 1803.	Helianthus petiolaris canus Brit., 1894.
H. rigidus Desf., 1829.	H. scaberrimus Ell., 1824.
H. strumosus var. mollis T. & Gr., 1842. Or H. mollis Willd., 1804. [Not Lam., 1789.]	H. strumosus macrophyllus (Willd., 1806.) Brit.
Actinomeris, Nutt., 1818.	Verbesina, L., 1753.
Verbesina Siegesbeckia Mx., 1803.	V. occidentalis (L., 1753.) Walt.
Actinomeris helianthoides Nutt.	V. helianthoides Mx.
A. squarrosa Nutt., 1818.	V. alternifolia (L., 1753.) Brit.
Coreopsis senifolia Mx., 1803.	Coreopsis major Walt., 1788.
C. senifolia var. stellata [Nutt., 1834.] T. & Gr.	C. major Oemleri (Ell., 1824.) Brit.
C. lanceolata var. villosa Mx., 1803.	C. crassifolia Ait., 1789.
Bidens chrysanthemoides Mx., 1803.	Bidens laevis (L., 1753.) B. S. P.
B. connata var. comosa A. Gr.	B. comosa (A. Gray.) Wiegand.
Coreopsis bidentoides Tor. & Gr.	B. bidentoides (Nutt.) Brit.
C. discoidea Tor. & Gr.	B. discoidea (Tor. & Gr.) Brit.
C. aurea Ait., 1789.	B. coronata (L., 1763.) Fisch.
C. trichosperma Mx.	B. trichosperma (Mx.) Brit.
C. aristosa Mx.	B. aristosa (Mx.) Brit.
C. involucrata Nutt. Or C. aristosa var. involucrata Auct.	B. involucrata (Nutt.) Brit.
Thelesperma filifolium A. Gray, 1849.	Thelesperma trifidum (Poir., 1811.) Brit.
T. filifolium Auct. [Not A. Gray.]	T. ambiguum A. Gray.
Balduina, Nutt., 1818. [Not Baldwinia, Raf., 1818.]	Actinospermum Ell., 1824.
Baldwinia uniflora, Ell.	A. uniflorum (Nutt.) Bernh.
Marshallia latifolia Pursh, 1814.	Marshallia trinervia (Walt., 1788.) Porter.
Riddellia, Nutt., 1821.	Psilostrophe, DC., 1828.
R. Tagetina Nutt.	P. Tagetinæ (Nutt.) Kze.
Hymenopappus scabiosæus L'Her., 1803.	Hymenopappus Carolinensis (Lam., 1792.) Porter.
Actinella, Nutt., 1818. [Not Pers., 1807.]	Picradenia, Hook., 1833.*
A. linearifolia Tor. & Gr.	P. linearifolia (Hook.) Brit.
A. scaposa Nutt.	P. scaposa (DC.) Brit.
A. acaulis Nutt.	P. acaulis (Nutt.) Brit.
A. odorata A. Gray.	P. odorata (DC.) Brit.
Leptopoda brachypoda T. & Gr., 1842.	Helenium nudiflorum Nutt., 1841.
Agassizia suavis A. Gray.	Gaillardia suavis (A. Gray.) Brit. & Rusby.
Dysodia chrysanthemoides [Willd., 1804.] Lag., 1816.	Dysodia papposa (Vent., 1800.) A. S. Hitchc.
Hymenantherum, Cass., 1817.	Thymophylla, Lag., 1816.
H. aureum A. Gray.	T. aurea (A. Gray.) Greene.
Maruta Cotula DC.	Anthemis Cotula L.
Leucanthemum vulgare Lam., 1778.	Chrysanthemum Leucanthemum L., 1753.
L. arcticum DC.	C. arcticum L.

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* Heller gives these as Actinella.

Current Names.	*Corrected Names.*
Matricaria Parthenium L. Or Leucanthemum Parthenium Godron.	C. Parthenium (L.) Pers.
Pyrethrum Balsamita Willd.	C. Balsamita L.
Matricaria discoidea DC., 1837	Matricaria matricaroides (Less.) Porter.
Artemisia Ludoviciana var. gnaphalodes T. & Gr.	Artemisia gnaphalodes Nutt.
Nardosmia palmata Hook.	Petasites palmata (Ait.) A. Gray.*
Petasites vulgaris Desf., 1798.	P. Petasites (L., 1753.) Karst.
Arnica nudicaulis Nutt., 1818.	Arnica acaulis (Walt., 1788.) B. S. P.
A. mollis Hook., 1833.	A. Chamissonis Less., 1831.
Erechthites hieracifolia Raf.	Erechthites hieracifolia (L.) Raf.
Cacalia reniformis Muhl.	Mesadenia [Raf., 1832] reniformis (Muhl.) Raf.
C. atriplicifolia L.	M. atriplicifolia (L.) Raf.
C. tuberosa Nutt.	M. tuberosa (Nutt.) Brit.
C. suaveolens L.	Synosma [Raf., 1832] suaveolens (L.) Raf.
Senecio Elliottii Tor. & Gr., 1843.	Senecio obovatus Muhl., 1804.
S. aureus var. discoideus Hook.	S. discoideus (Hook.) Brit.
S. aureus var. Balsamitæ T. & Gr.	S. Balsamitæ Muhl.
S. aureus var. compactus A. Gr.	S. compactus (A. Gr.) Rydberg.
S. gracilis Pursh.	S. aureus gracilis (Pursh) Brit.
Arctium Lappa var. tomentosum A. Gray.	Arctium tomentosum (Lam.) Schk.
Lappa major Gaertn., 1802.	Arctium Lappa L., 1753.
L. minor DC., 1805. Or Arctium Lappa var. minus A. Gr.	Arctium minus Schk, 1803.
Cirsium lanceolatum Scop.	Carduus lanceolatus L.
Cirsium altissimum Spreng. Or Cnicus altissimus Willd.	C. altissimus L.
Cirsium discolor Spreng. Or Cnicus altissimus var. discolor A. Gr.	C. discolor (Muhl.) Nutt.
Cirsium Virginianum Mx.	C. Virginianus L.
Cirsium Pitcheri Tor. & Gr. Or Cnicus Pitcheri Torr.	C. Pitcheri (Torr.) Brit.
Cirsium undulatum Spreng. Or Cnicus undulatus A. Gray.	C. undulatus Nutt.
Cirsium ochrocentrum A. Gray (1849). Or Cnicus ochrocentrus A. Gray (1883).	C. ochrocentrus (A. Gray.) Greene.
Cirsium pumilum [Nutt., 1818.] Spreng. Or Cnicus pumilus Torr.	C. odoratus (Muhl., 1813.) Porter.
Cnicus Hillii Canby.	C. Hillii (Canby.) Porter.
Cirsium muticum Mx. Or Cnicus muticus Pursh.	C. muticus (Mx.) Pers.
Cirsium horridulum Mx., 1803. Or Cnicus horridulus Pursh.	C. spinosissimus Walt., 1788.
Cirsium arvense Scop. Or Cnicus arvensis Hoffm.	C. arvensis (L.) Robs.
Silybum Marianum Gærtn. Or Carduus Marianus L.	Mariana Mariana (L.) Hill.

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* Heller gives Tussilago palmata Ait. and T. Petasites L.

Mr. Remington: I think this paper contains exactly the kind of information the pharmacist needs, and, as Dr. Lyons has modestly said, it should be of particular value to our amateur botanists. I move that the paper be received and published in the Proceedings.

Dr. Rusby: I move, by way of amendment, that Dr. Lyons complete his paper from the Third Volume of Britton & Brown's Flora, which is out now.

The original motion, as amended, was adopted.

Mr. Kraemer read in abstract a paper on a Scheme for the Identification of Powdered Drugs, the reading of which was greeted with applause at the close.

QUALITATIVE EXAMINATION OF POWDERED VEGETABLE DRUGS.

BY HENRY KRAEMER.

In this communication are embodied the principles of a scheme for the determination of unknown powders. While the paper has primarily to do with the consideration of *official vegetable drugs*, still it has been found necessary to incorporate with it also the important *non-official-vegetable drugs* and *food products*, as well as the *pulveres* (composed of inorganic and vegetable substances), some of the *compound powders* for making various preparations, and all of the principal *plant constituents*, as opium, guaiac resin, etc. The proximate principles of plants, other than starch, have been omitted, owing to the fact that they require a somewhat different treatment. Somewhere in the neighborhood of 300 powders are considered. The whole scheme is but tentative, and will doubtless require some changes, but gives us a basis for subsequent work at least. It has not been possible up to the present time, owing to the pressure of duties, to finish the drawings for publication of the points considered, but even without these, those who are familiar with the microscopical characteristics of crude drugs and the general principles of chemical analysis will find little or no difficulty in the utilization of the same. The drugs under consideration are divided according to the varying shades of color, into seven classes:

I. Color, some shade of light green to gray.

II. Color, nearly white.

III. Color, some shade of yellow.

IV. Color varying from some shade of tan or ecru to dark brown, or even dark blue or black.

V. Color, some shade of red.

VI. Powders that vary in fineness from Nos. 20 to 30 or less, and are with difficulty examined by means of the microscope without further treatment, as sectioning, etc.

VII. Drugs that do not occur in the powdered condition.

The author was some time in coming to the conclusion that powdered drugs could be arranged along color lines before taking them up scientifically for identification. It is true it is necessary to arrange samples of the powder in convenient vials and mount on white card board, to appreciate the ground for the classification adopted. It will also be found that there are a few of the powders under the different groups, as No. I, that might be considered advantageously under others, as No. IV. In such cases samples must be arranged under both, and this has been done as far as possible by the author.

The largest groups are Nos. I and IV, and it will be found that they include a more natural grouping than we would at first suppose. Under No. I we find chiefly the herb and leaf drugs, while under No. IV are chiefly roots, rhizomes and barks. It has been found necessary, owing to the difference in predominating constituents or tissues, to work up each group differently.

GROUP NO. 1. COLOR GREEN TO GRAY.

Coca, Buchu, Mentha Viridis, Matico, Chelidonium, Guaiaci Resina, Gaultheria, Lobelia (herb), Passion Flower, Pulsatilla, Lobelia (leaves), Buchu (long), Calumba, Eucalyptus, Absinthium, Pilocarpus, Senna (Alexandria and India), Scutellaria, Castanea, Eupatorium, Tanacetum, Mentha Piperita, Anisum, Fœniculum, Conium, Belladonnæ Folia, Insect Powder (Persian), Salvia, Eriodictyon, Hamamelis, Matico, Uva Ursi, Scoparius, Grindelia Robusta, Chimaphila, Hyoscyamus, Stramonii Folia, Galla (Chinese or Japanese), Cypripedium, Aletris, Digitalis, Marrubium, Piper Nigrum, Ergota, Hedeoma, Sarsaparilla (Mexican), Cimicifuga, Spigelia, Leptandra, Arnicæ Radix, Chenopodium, Sarsaparilla (American), Xanthoxylum Fraxineum, Xanthoxylum Americanum, Aralia Spinosa, Senega, Sarsaparilla (Honduras), Sumbul, Taraxacum, Serpentaria, Piper Album, Aurantii Amari Cortex, Aurantii Dulcis Cortex, Limonis Cortex, Helonias Dioica, Caulophyllum, Angelica, Kava Kava, Nux Vomica, Belladonnæ Radix.

I. WITHOUT FIBRO-VASCULAR TISSUES.

1. *Ergota.*—Oil globules; red or violet coloration in chloral and sulphuric acid; odor.

II. WITH FIBRO-VASCULAR TISSUES.

A. WITH CALCIUM OXALATE CRYSTALS.[*]

a. CRYSTALS ROSETTE OR STAR-SHAPED.

α. *Containing Starch.*[†]

2. *Aralia Nudicaulis.*—Crystals 35–70 μ; starch, 10–15 μ; secretion reservoirs (yellow and brown); sclerenchyma.

3. *Aralia Spinosa.*—Crystals about 50 μ; starch about 10 μ: reservoirs containing oil and resin; cork brownish; sclerenchyma fibres; also, sometimes fine needle-shaped crystals.

4. *Galla (Chinese or Japanese).*—Few crystals, 20 μ; starch 40 μ; non-secreting hairs; milk vessels accompanying ducts; mounts in glycerin show acicular crystals of gallic acid.

5. *Passion Flower.*—Crystals 15 μ; starch; pollen 35–45 μ; sclerenchyma.

6. *Podophyllum.*—Crystals 50 μ in diameter; starch 5–8 μ diameter, single grains to 2–6 compound; numerous single or groups of cells colored yellow; sclerenchyma fibres and ducts.

7. *Spigelia.*—Crystals 5–15 μ; starch 4 μ; parenchyma and long light-colored sclerenchyma fibres characteristic; apparently at one stage or in an admixed drug, calcium carbonate is present.

β. *Without Starch.*

8. *Anisum.*—Crystals 2–3 μ in aleuron grains 6 μ in diameter; non-secreting hairs; secretion reservoirs; epidermis of seed coat and pericarp characteristic.

9. *Buchu.*—Crystals 15–20 μ; sphere-crystals of a carbohydrate 35 μ; mucilage; sclerenchyma very characteristic; non-secreting hairs; heavy cuticle; oil secretion reservoirs.

10. *Castanea.*—Crystals 15 μ; wavy epidermis; sclerenchyma; some pollen grains; presence of few or no non-secreting hairs distinguish it from *Castanea pumila.*

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[*] If there are any doubts about the presence of calcium oxalate crystals, sulphuric acid may be added to the powder, when numerous needle-shaped crystals of calcium sulphate will generallly separate. It must be also stated that in plants containing calcium oxalate the form may be in needles, in addition to the characteristic form given.

[†] If there are any doubts about the presence of starch, the reaction for which is sometimes hid by the presence of resinous or other principles, a small quantity of the powder may be boiled for a minute with a few drachms of water in a test-tube, the liquid filtered and tested with iodine and potassium iodide solution.

Regarding the presence of reserve starch and calcium oxalate crystals in plants, the amount of these constituents is an uncertain one, owing to the changes induced by certain Fungi. J. H. Walker, in "Pringsheim's Jahr. f. wissensch. Bot." xxiv. p. 499, states that he found in Rhamnus Frangula the calcium oxalate crystals to be fewer, and the starch grains more numerous when plants were diseased. See, also, "Hartig's Lehrbuch der Baumkrankheiten and Byron D. Halsted's paper before the A. A. A. S.

11. *Cannabis Indica.*—Crystals 20 μ: characteristic crystolith (200 μ long) with or without broad base (containing $CaCO_3$ in granular masses) attached; oil secretion hairs; characteristic cells of pericarp.

12. *Chimaphila.*—Crystals 55 μ; tannin masses; chimaphilin red with H_2SO_4.

13. *Conium.*—Crystals 2 μ in aleuron grains about 5 μ; no oil secretion reservoirs of Umbelliferæ; characteristic outer epidermis of seed coat and pericarp; odor alone or when rubbed with KOH.

14. *Eriodictyon.*—Crystals 20–25 μ; long 1-celled, non-secreting hairs; also secreting hairs.

15. *Eucalyptus.*—Three kinds of crystals: rosette-shaped, 15 μ diameter; tetragonal 4 x 14 and 25 x 15 μ; thick, greenish cuticle; oil secretion reservoirs and characteristic sclerenchyma.

16. *Fœniculum.*—Crystals 2 μ in aleuron grains about 6 μ; oil secretion reservoirs with characteristic inner epidermis of pericarp running at right angles to length of the former; peculiar thickened and latticed parenchyma.

17. *Gaultheria.*—Crystals 20 μ, look as though made up of little plates; stomata numerous with 2 "Nebenzellen"; tufts of fan-shaped crystals (28 μ); stone cells with reddish coloring matter; in chloral glycerin some tissue colored purplish: with $FeCl_3$ tannin and oil colored dark purple.

18. *Hedeoma.*—See No. 57. In glycerin mounts have sphere-shaped crystals separating.

19. *Insect Powder.*—Pyrethrum roseum, or Persian—numerous rounded and prickly pollen grains, 25 μ; some few crystals (2 x 8 μ), in stone or in parenchyma adjoining; sclerenchyma fibres, 17 x 105 μ, in Dalmatian being 20 x 160 μ; fragments of T-non-secreting hairs less numerous than in Dalmatian; characteristic, isolated, somewhat rounded or elliptical (75 x 95 μ), parenchyma cells also occurring in papillæ-like fragments. Fragments of papillæ of the epidermis of corolla, acute and more numerous than in Dalmatian. In latter rounded and scarcely perceptible; secretion hairs 50 μ, being smaller in Persian than in Dalmatian; rose-colored fragments in chloral mounts possibly more numerous in the Persian powder.

20. *Pilocarpus.*—Crystals 17 μ; few non-secreting hairs; long sclerenchyma fibres; oil secretion reservoirs; few palisade cells.

21. *Senna.*—Possesses four kinds of crystals—rosette, cubical, tetragonal and coffin-shaped, of which the rosette occurs least, and the other three in greatest amount; 1-celled hairs more numerous in Alexandria than in India senna. Boil a small quantity with water, filter and to the light lemon colored filtrate add KOH-red, due to chrysophanic acid reaction.

22. *Stramonii Folia.*—Crystals 10–15 μ, occurring in a characteristic line through the middle of the leaf just below the palisade cells; some secreting and non-secreting hairs.

b. CRYSTALS, CUBICAL, RHOMBOHEDRAL, PRISMATIC, TETRAGONAL OR COFFIN-SHAPED.

α. Containing Starch:

23. *Cardamom.*—Crystals very small; starch in single small grains, and in masses; fragments of thick, dark sclerenchyma cells forming the outer and particularly the inner epidermis of seed coat. The Malabar is distinguished from the Ceylon in that the latter has a few 1-celled hairs, the starch grains and crystals larger and sclerenchyma cells are more prominent.

When the pericarp or fruit wall is present, this is determined by its large parenchyma cells containing brown masses; also sclerenchyma fibres.

24. *Calumba.*—In the stone cells the cubical crystals 15 μ; starch grains characteristic, 35 x 25 μ.

25. *Gelsemium.*—Crystals of three kinds; diamond-shape, 15 x 15 μ, tetragonal, 15 x 20 μ or twin, large prismatic as in quillaja, 8 x 28 μ; starch, 8 x 8 μ: numerous sclerenchyma fibres. In overground stem we find remains of chloroplastids in collenchyma; root distinguished from stem by absence of fragments of altered sieve (*i. e.*, internal phlœm).

26. *Guaiaci Resina.*—See Note No. 94.

27. *Pulv. Glycyrrhizæ Co.*—Cubical crystals 3 x 2 μ in crystal fibres in fragments of about 117 μ in length; starch about 5 μ in length; characteristic crystals and hairs of senna (see No. 21). The powder made from Russian licorice contains few or no fragments of cork.

28. *Spigelia.*—See No. 7.

29. *Xanthoxylum.*—Crystals 7 x 10 μ; starch 10 μ; oil secretion reservoirs; in chloral mount numerous oil globules; sclerenchyma cells and fibres in *X. fraxineum.*

β. Without starch:

30. *Coca.*—Crystals cubical 3 x 3 μ, coffin-shaped, 3 x 10 μ; peculiarity of epidermis; absence of hairs; *odor.*

31. *Eucalyptus.*—See No. 15.

32. *Gaultheria.*—See No. 17.

33. *Hamamelis.*—Crystals 7–10 μ; 1-celled, non-secreting hairs; tannin and resin masses.

34. *Hyoscyamus.*—Crystals of two kinds—rosette-shaped and more or less cubical (10 x 10 μ), the latter chiefly. Numerous secreting and non-secreting hairs.

35. *Senna.*—See No. 21.

36. *Stramonii Folia.*—See No. 22. The rosette-shaped crystals are generally in greater abundance.

37. *Uva Ursi.*—Prismatic and coffin-shaped crystals (7 x 10 μ), in crystal fibres; tannin masses; characteristic sclerenchyma fibres; no oil-cells or reservoirs.

c. CRYSTALS ACICULAR (RAPHIDES).

38. *Cypripedium.*—Crystals 35–58 μ long; starch 2–4 μ; root hairs; oil and resin cells; characteristic odor.

39. *Helonias.*—Characteristic small acicular crystals (35 μ long) in small groups; starch.

40. *Sarsaparilla.*—Crystals 68 μ long; starch 10–20 μ; sclerenchyma fibres. In Mexican sarsaparilla find a pronounced yellowish hypodermis and endodermis, the walls of which are unequal in thickness. In Honduras the latter cells are not so pronounced. Starch in both rather characteristic.

Needle-shaped crystals other than calcium oxalate are sometimes found in the following:

41. *Buchu.*—See No. 9.
42. *Coca.*—See No. 30.
43. *Chelidonium.*—See No. 52.
44. *Gaultheria.*—See No. 17.
45. *Lobelia.*—See No. 61.

d. CRYSTALS AS FINE SAND-LIKE PARTICLES IN PARTICULAR CELLS.

LIKELY TO FIND ALSO ACICULAR CRYSTALS.

46. *Belladonnæ Folia.*—Characteristic grayish or dark-colored cells containing small angular crystals of calcium oxalate; few secreting and non-secreting hairs.

47. *Dulcamara.*—Crystal-sand; starch, 5–7 μ; acicular crystals in parenchyma of bark; ducts with bordered pores; ducts, 35–45 μ in width, and accompanied with sclerenchyma fibres; occasional single bast fibre; cork.

B. CALCIUM OXALATE CRYSTALS FEW OR WANTING.

a. SIMPLE HAIRS PRESENT.

48. *Absinthium.*—T-non-secreting hairs; secreting hairs.

49. *Belladonnæ Folia.*—Might be considered here as crystal-sand could be overlooked. See No. 46.

50. *Buchu.*—See No. 9.

51. *Castanea.*—See No. 10.

52. *Chelidonium.*—Non-secreting hairs; milk vessels contain reddish masses; epidermis with papillæ and sinuate margins on surface view; acicular crystals sometimes observed in glycerin mounts.

53. *Digitalis.*—Characteristic non-secreting and secreting hairs; stomata each with 4–5 "Nebenzellen."

54. *Eriodictyon.*—See No. 14.

55. *Eupatorium.*—Non-secreting and secreting hairs; pollen grains 15 μ; characteristic style.

56. *Galla.*—See No. 14.

57. *Hamamelis.*—See No. 33.

58. *Hedeoma.*—Non-secreting hairs, 2–3-celled; peculiar thickened or reticulated cells of anther; in glycerin mounts, crystals of carbohydrate in "Athemhöle."

59. *Insect Powder.*—See No. 19. Crystals may not be observed.

60. *Hyoscyamus.*—See No. 34.

61. *Lobelia.*—Non-secreting hairs; sclerenchyma; pollen grains 30 x 15 μ; reticulated seed coat. Leaves distinguished from herb in that in the former are fewer pollen grains and seeds.

62. *Matico.*—Non-secreting hairs of two kinds; few short, but numerous long and peculiarly jointed; oil secretion reservoirs, numerous in tissues of fruit; spiral ducts, pollen grains nearly cubical; much sand in among the fruit fragments.

63. *Marrubium.*—1–4-celled, non-secreting hairs, either single or in groups; large oil-secreting hairs.

64. *Mentha Piperita* and 65. *Mentha Viridis.* } In chloral mount violet-colored fragments of petals; pollen grains; jointed non-secreting and secreting hairs. In Mentha piperita sometimes find in the secretion hairs crystals of menthol. Non-secreting hairs peculiar and apparently more abundant in Mentha viridis than in M. piperita; taste test characteristic for each.

66. *Nux Vomica.*—Non-secreting hairs gave the characteristic reaction for lignin; endosperm, with thick walls, contains oil and protein; blue with $H_2SO_4+K_2Cr_2O_7$.

67. *Pulsatilla.*—Non-secreting hairs, long and 1-celled; sclerenchyma (mechanical cells).

68. *Salvia.*—Non-secreting hairs; 1–4-celled and jointed; also, two kinds of non-secreting hairs: stomata, each with two "Nebenzellen."

69. *Scoparius.*—Non-secreting hairs; pollen grains are cubical and may be mistaken for crystals; sclerenchyma with brown contents in lumen.

70. *Scutellaria.*—Non-secreting hairs long, jointed (5 cells); two kinds of secretion hairs; sclerenchyma characteristic and prominent.

71. *Senna.*—See No. 21.

72. *Stramonii Folia.*—See No. 22.

73. *Strophanthus.*—Long secretion hairs, in diameter 10–15 μ; starch grains, 4 μ; parenchyma containing oil, aleuron and starch; narrow, almost colorless collapsed cells.

74. *Tanacetum.*—Characteristic, bent, non-secreting hairs, made up of 4–5 cells; pollen grains 15 μ; odor characteristic.

b. CONTAINING SECRETION HAIRS OR RESERVOIRS; AROMATIC AND OF CHARACTERISTIC ODOR.

a. *With oil-secreting hairs.*

75. *Absinthium.*—See No. 48.

76. *Arnicæ Flores.*—Characteristic 5–6 celled, jointed, non-secreting hairs of corolla; also double hairs on outside of ovary; pappus; pollen grains; sclerenchyma.

77. *Belladonnæ Folia.*—See No. 46.

78. *Eriodictyon.*—See No. 14.

79. *Eupatorium.*—See No. 55.

80. *Grindelia.*—Secretion hairs; pollen grains, 20 μ; large number of palisade cells; sclerenchyma cells and fibres.

81. *Hedeoma.*—See No. 58.

82. *Mentha Piperita*
and
83. *Mentha Viridis.* } See Nos. 64 and 65.

84. *Pulsatilla.*—See No. 67.

85. *Salvia.*—See No. 68.

86. *Scoparius.*—See No. 69.

87. *Scutellaria.*—See No. 70.

β. Containing secretion reservoirs:

88. *Angelica.*—Starch; size of parenchyma cells containing starch characteristic; sclerenchyma; odor.

89. *Arnicæ Radix.*—Inulin masses or crystals soluble in hot water; sclerenchyma fibres; resinous masses.

90. *Caulophyllum.*—Parenchyma cells containing starch; characteristic sclerenchyma; odor.

91. *Cimicifuga.*—Reserve starch; sclerenchyma fibres; ducts.

92. *Eucalyptus.*—See No. 15.

93. *Gaultheria.*—See No. 17.

94. *Guaiaci Resina.*—Numerous lemon-yellow or dark-brown resin masses, which on mounting in chloral have a wine-colored halo around them; few fragments of tissues, with characteristic sclerenchyma cells and fibres; few crystals of calcium oxalate (cubical or coffin-shaped) in parenchyma.

95. *Kava-Kava.*—Starch; yellowish resin and oil; sclerenchyma more of nature of that found in fruits and seeds.

96. *Leptandra.*—Starch characteristic; brown stone cells.

97. *Matico.*—See No. 62.

98. *Pilocarpus.*—See No. 20.

99. *Piper Album*
and
100. *Piper Nigrum.* } Starch and oil in perisperm; stone cells. Piper album has fewer stone cells than Piper nigrum.

101. *Sabina.*—Starch, 4 μ: characteristic hypodermis, consisting of long fibres (15 μ wide), associated with epidermis.

102. *Sumbul.*—Starch; sclerenchyma fibres numerous.

103. *Tanacetum.*—See No. 74.

C. SCLERENCHYMA CELLS (STONE CELLS) OR FIBRES (WOOD OR BAST).[1]

104. *Aletris.*—Starch; yellowish or reddish-yellow colored sclerenchyma.

105. *Arnicæ Radix.*—See No. 89, sclerenchyma fibres.

106. *Calumba.*—See No. 24, stone cells.

107. *Cimicifuga.*—Starch; resin cells; sclerenchyma fibres; ducts.

108. *Chenopodium.*—Characteristic reddish-brown pericarp and seed coat; numerous starch grains, in size up to 10 μ; fine granular contents = aleuron.

109. *Chirata.*—No starch; few small pollen grains, 4 x 10 to 7 x 10 μ; parenchyma large, with simple pores; many sclerenchyma fibres, in width 20 μ, walls 4 μ thick; scalariform ducts 30 μ in width, also isolated spiral ducts; yellow epidermis, with some collenchymatic parenchyma, latter with brown contents; with the latter are associated mycelial-like development, containing blackish-brown colored substance; few seeds in shape like hyoscyamus, and reticulated like lobelia, but cells larger and walls 4 μ thick.

110. *Cydonium.*—Without starch or calcium oxalate crystals; outer clear mucilage cells as in Linum; beneath the latter are thick-walled cells, containing brown contents, which react like tannin; parenchyma containing oil and aleuron.

111. *Grindelia.*—See No. 80, stone cells and fibres.

112. *Guaiaci Resina.*—See No. 94, very few stone cells and fibres.

113. *Lappa.*—Numerous irregular transparent fragments or sphere crystals (more or less fan-shaped) soluble in hot water = Inulin; no secretion reservoirs; more wood fibres and possibly larger reticulated ducts (as much as 70 μ wide) than Inula; cells of periderm brownish, becoming yellow.

114. *Leptandra.*—Starch characteristic; brown stone cells.

115. *Piper Album*
and } See No. 99 and 100, stone cells.
116. *Piper Nigrum.*

117. *Physostigma.*—Starch, 25 x 40 μ; oil and protein in irregular granular masses; characteristic sclerenchyma and stone cells whose contents are reddened by alkalies.

118. *Podophyllum.*—Crystals sometimes appear wanting; starch grains single (5–8 μ) or in groups of 4 to 6 grains; numerous single cells or groups with yellowish resinous contents; ducts and sclerenchyma fibres.

119. *Sarsaparilla* (*Honduras*)
and } See No. 40.
120. *Sarsaparilla* (*Mexican.*)

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[1] If thought necessary, can isolate characteristic stone cells and sclerenchyma fibres by treatment of powder with Schultze's macerating fluid or sulphuric acid.

121. *Senega.*—Parenchyma and sclerenchyma fibres characteristic; mounts in chloral show some pinkish (or strawberry-colored) cells.

122. *Scoparius.*—See No. 69.

123. *Scutellaria.*—See No. 70.

124. *Spigelia.*—Rosette crystals, 10–15 μ; tetragonal crystals, 3–10 μ; sclerenchyma fibres; parenchyma containing pink-colored contents; starch, 4 μ; peculiar hypodermis; may contain $CaCO_3$.

125. *Sumbul.*—Starch; resin secretion reservoirs; numerous sclerenchyma fibre .

D. SEEDS WITH THEIR CHARACTERISTIC SEED COATS.

126. *Chenopodium.*—See No. 108.

127. *Lobelia.*—See No. 61.

E. RESERVE STARCH.

128. *Aletris.*—See No. 104, sclerenchyma.

129. *Angelica.*—See No. 88, parenchyma, odor.

130. *Aralia Nudicaulis.*—See No. 2, crystals.

131. *Aralia Spinosa.*—See No. 3, crystals.

132. *Caulophyllum.*—See No. 90, parenchyma, odor.

133. *Chenopodium.*—See No. 108, stone cells.

134. *Cimicifuga.*—See No. 91, fibres.

135. *Cypripedium.*—See No. 38, crystals, resin.

136. *Helonias.*—See No. 39, crystals.

137. *Kava-Kava.*—See No. 95, sclerenchyma.

138. *Leptandra.*—See No. 114, stone cells.

139. *Physostigma.*—See No. 119, sclerenchyma cells and fibres.

140. *Piper Album*
and — See Nos. 115 and 116, stone cells.
141. *Piper Nigrum.*

142. *Sarsaparilla (Honduras)*
and — See No. 40, sclerenchyma.
143. *Sarsaparilla (Mexican).*

144. *Spigelia.*—See No. 124, parenchyma.

145. *Serpentaria.*—Starch, 10 μ, grains as a whole apparently larger than in spigelia; sclerenchyma fibres and ducts; many parenchyma cells contain a yellowish or reddish-brown substance, as also the cork cells.

146. *Sumbul.*—See No. 125, sclerenchyma fibres.

147. *Xanthoxylum.*—See No. 29.

F. CONTAINING POLLEN GRAINS.

148. *Castanea.*—See No. 10, crystals.

149. *Chelidonium.*—See No. 52, milk vessels.

150. *Eupatorium.*—See No. 55, hairs.

151. *Grindelia.*—See No. 80, hairs and sclerenchyma.

152. *Hedeoma.*—See No. 58, hairs, stomata.
153. *Insect Powder.*—See No. 19, hairs and sclerenchyma.
154. *Lobelia.*—See No. 61.
155. *Marrubium.*—See No. 63, hairs.
156. *Mentha Piperita,*
and — See Nos. 64 and 65, hairs.
157. *Mentha Viridis.*
158. *Passion Flower.*—See No. 5, pollen.
159. *Pulsatilla.*—See No. 67, hairs.
160. *Scoparius.*—See No. 69, hairs.
161. *Scutellaria.*—See No. 70, hairs.
162. *Tanacetum.*—See No. 74, hairs.

G. INULIN MASSES OR CRYSTALS (SOLUBLE IN HOT WATER).

163. *Arnicæ Radix.*—See No. 89, sclerenchyma and resin masses.
164. *Lappa.*—See No. 113, ducts and wood fibres.

165. *Taraxacum.*—Numerous crystal-like groups, or sphere-crystals, giving in glycerin mounts the parenchyma a characteristic appearance; yellowish-brown milk vessels 10 μ in width; reticulated ducts are 45 μ wide, and associated with them are characteristic non-lignified "Ersatzfasern."

H. CONTAINING TANNIN MASSES.

166. *Chimaphila.*—See No. 12, crystals.
167. *Galla.*—See No. 4, crystals and starch.
168. *Gaultheria.*—See No. 17, crystals.
169. *Hamamelis.*—See No. 33, crystals and hairs.
170. *Uva Ursi.*—See No. 37, crystals.

GROUP NO. 2. COLOR WHITISH.

Wheat Flour, Corn Starch, Wheat Starch, Potato Starch, Rice Starch, Bermuda Arrowroot Starch, Montserrat Arrowroot Starch, Wheat Middlings, Corn Meal, Corn Bran, Orris Root, Resina Jalapæ, Dextrin (white), Gum Arabic (white), Tragacanth, Saccharum (cane), Sacch. Lactis, Scilla, Camphora, Talc, Prepared Chalk, Ppt. Chalk, Pulv. Cretæ Comp., $BaCO_3$, $BaSO_4$, $CaSO_4$, Heavy Magnesia (MgO), Light Magnesia (MgO), Antimony Oxide, Antimonial Powder, Tartar Emetic, Calcium Phosphate Ppt. $Ca_3(PO_4)_2$, Terra Alba, Potassium Bitartrate.

I. PLANT TISSUE OR CELL CONTENTS RECOGNIZABLE.

A. CONTAINING STARCH.

a. UNALTERED STARCH ALONE.

Grains characteristic for each; completely soluble in glycerin on heating, and precipitated on the addition of water.

171. *Arrowroot Starch* (Bermuda).

172. *Arrowroot Starch* (Montserrat).

173. *Corn Starch.*

174. *Rice Starch.*

175. *Wheat Starch.*—Does not agglutinate on mixing with water; distinction from wheat flour.

b. ALTERED AND UNALTERED STARCH GRAINS.

176. *Dextrin.*—Sticky mass with water; unaltered starch grains detected.

c. PLANT TISSUES IN ADDITION TO STARCH GRAINS.

The tissues remain upon treatment with hot glycerin.

a. Do not readily dissolve or swell in cold water and become transparent and sticky.

177. *Corn Meal.*—More starch and oil and little hull.

178. *Corn Bran.*—Less starch and oil and more hull.

179. *Wheat Flour.*—Agglutinates with water, distinction from wheat starch; little tissue of wheat grain.

180. *Middlings of Wheat.*—Starch and numerous fragments of tissues of wheat.

181. *Orris Root.*—Characteristic starch grains 15 x 15 to 15 x 30 μ; scalariform ducts 25 μ wide; no cork.

b. Soluble or swell in cold water to form a sticky mass.

182. *Acacia* (white).—Soon affected by water; few plant tissues.

183. *Tragacanth.*—Slowly affected by water; fragments of ducts and parenchyma; more likely to find corn starch grains in commercial powder.

B. WITHOUT STARCH.

a. ACICULAR CRYSTALS.

184. *Scilla.*—Also find isolated fragments of fibro-vascular tissue.

II. ABSENCE OF PLANT TISSUES.

A. SOLUBLE IN WATER.

185. *Cane Sugar.*—Characteristic crystals; soluble also in mounts of glycerin and glycerin + chloral; taste.

186. *Potassii Bitartras.*—Soluble in water with acid reaction; with sodium cobaltic nitrite solution get small yellow cubical crystals, which are permanent in glycerin mount.

187. *Tartar Emetic.*—Large irregular masses; add HCl to the powder on a slide, and then pass H_2S over the same, get an orange-red precipitate, which is permanent in a glycerin mount.

B. INSOLUBLE IN WATER.

a. SOLUBLE IN ALCOHOL.

188. *Camphor.*—Liquefies in mounts of glycerin and chloral; glycerin mounts show irregular masses.

189. *Resina Jalapæ.*—In glycerin get irregular opaque fragments, which swell and by and by look like huge amœboid masses; in glycerin and chloral the fragments become rounded, transparent and finally dissolve.

b. INSOLUBLE IN ALCOHOL.

α. With H_2SO_4 *reddish color after some time.*

190. *Saccharum Lactis.*—Small and large irregular-shaped crystals, insoluble in mounts of glycerin or glycerin + chloral.

β. No color reaction with H_2SO_4.

* *Soapy feel.*

191. *Talc (or Magnesium Silicates).*—Rather lustrous long irregular crystals.

** *Affected by acetic acid.*

† *With effervescence.*

192. *Calcii Carbonas Præcipitatus* ($CaCO_3$).—Add hot solution of ammonium oxalate to acetic acid solution on slide, get crystals of calcium oxalate. Mount in glycerin and observe rosette or cubical crystals of a rather uniform size.

193. *Creta Præparata* ($CaCO_3$).—Same treatment as above, but crystals are triangular and cubical and not of uniform shape.

194. *Pulvis Cretæ Compositus.*—On addition of acetic acid notice peculiar gummy mass containing crystals of sugar, which are soluble in water.

195. *Barium Carbonate* ($BaCO_3$).—Add H_2SO_4, and in glycerin mount the $BaSO_4$ precipitate is bacteria-like; flame test, green.

†† *Soluble in acetic acid without effervescence.*

196. *Heavy Magnesia* (MgO).—Alone in glycerin mount observe small rounded masses frequently grouped together; dissolve a few milligrammes on a slide or watch crystal in citric acid, then add a few drops (excess) of ammonium hydrate and Na_2HPO_4 and stir vigorously with a glass rod, triangular or tetragonal crystals are formed in glycerin mount.

197. *Light Magnesia* (MgO).—In glycerin mount looks like heavy magnesia, but masses are larger and more transparent. On treatment with citric acid, NH_4OH and Na_2HPO_4, the crystals of $MgNH_4PO_4$ in glycerin mount are large, star-shaped, and look like snow crystals.

*** *Unaffected by acetic acid.*

† *Soluble in Nitric Acid.*

If necessary, in deciding on any of the next three, they are to be fused with K_2CO_3 or Na_2CO_3, and a regular qualitative chemical separation effected.

198. *Calcii Phosphas Præcipitatus* [$Ca_3(PO_4)_2$].—In glycerin mount alone get small tetragonal and cubical crystals. If to a few milligrammes of the powder on a slide, we add a few drops of HNO_3, and then ammonium molybdate solution, stirring well with a glass rod, get small yellow diamond-shaped crystals, permanent in glycerin mounts.

199. *Calcii Sulphas.*—In glycerin mount alone observe needle-shaped crystals or long crystals in masses (looks like group of sclerenchyma fibres) ; flame test on platinum wire = bright reddish-yellow.

200. *Barium Sulphate.*—In glycerin mount alone observe irregular-shaped crystals varying from small to large ; flame test = green.

201. *Terra Alba.*—This is aluminum silicate (3 : 5) and magnesia.

†† *Insoluble in nitric acid.*

202. *Antimony Oxide.*—In glycerin mount alone get irreglar, transparent, small to large fragments : add drop of HCl to powder on the slide, then pass H_2S over the solution, get orange-red precipitate.

203. *Antimonial Powder.*—Small tetragonal and cubical as well as irregular transparent crystals. Add HCl, then H_2S = orange-red precipitate.

GROUP NO. 3. COLOR, SOME SHADE OF YELLOW.

Washed Sulphur, Sulphur Præcipitatum, U. S. P. (Lac Sulphur or Milk of Sulphur), Mastic, Glycyrrhiza (Russian), Scammony Resin, Resina, Lycopodium, Sandarac, Sinapis Alba, Dextrin (yellow), Aurantii Amari Cortex, Aurantii Dulcis Cortex, Ammoniac, Limonis Cortex, Zingiber (Jamaica), Calendula, Angustura bark, Tr. Rhei Dulc., (Co. Powder), Rhamnus Purshiana, Tr. Rhei Arom. (Co. Powder), Rheum, Hydrastis, Resina Podophylli, Aloes (Cape), Chrysophanic Acid, Gamboge, Turmeric, Yellow Ochre (Argillaceous or Calcareous Earth, Fe and Mn Oxides), Curry Powder.

I. POSSESSING VEGETABLE TISSUES OR CELL CONTENTS.

A. CELL-CONTENTS ALMOST ENTIRELY.

a. Starch Grains.

204. *Dextrin.*—Altered and unaltered starch grains.

b. No starch.

205. *Lycopodium.*—Characteristic spores entirely.

B. CELL-CONTENTS AND VEGETABLE TISSUES.

a. WITHOUT ANY OR BUT LITTLE STARCH.

206. *Aurantii Amari Cortex.*—Thick-walled parenchyma (walls 10–15 μ thick) ; oil secretion reservoirs (120 μ in diameter) ; few ducts : brownish-green outer layer ; crystals of calcium oxalate cubical (15 x 15 μ).

207. *Aurantii Dulcis Cortex.*—Parenchyma cells with walls not so thick

as the bitter orange peel, being 4 μ thick; secretion reservoirs about 350 μ in diameter; few ducts; outer layer orange-yellow; crystals of calcium oxalate either cubical (30 x 30 μ), or prismatic, as in quillaja (35 x 10 μ); likely to find sphere crystals of carbohydrate in glycerin mounts.

208. *Limonis Cortex.*—Secretion reservoirs as large as in sweet orange peel; outer layer pale (lemon) yellow; walls of parenchyma 5 μ thick; calcium oxylate crystals, about as in bitter orange peel; sphere crystals, as in sweet orange peel.

209. *Sinapis Alba.*—Oil, aleuron and characteristic seed coat.

210. *Calendula.*—Characteristic tissues of petals containing oily drops; few pollen grains; reaction with H_2SO_4.

b. CONTAINING STARCH.

a. Without crystals of calcium oxalate.

211. *Hydrastis.*—Starch 4 μ; wood fibres and ducts yellowish; few, sometimes numerous prismatic crystals in a rosette = berberine; upon addition of H_2SO_4 get abundant needle-shaped crystals.

β. With crystals of calcium oxalate.

* *Crystals very small and likely to be overlooked.*

212. *Ginger* (Jamaica).—Unaltered starch grains 15 x 30 μ; yellowish (oil) and reddish (resin) cells; fibro-vascular tissue.

213. *Turmeric.*—Altered starch grains (test with iodine) in irregular masses (70 x 100 to 100 x 140 μ) of shape of cell in which formed; bright yellow oil-secretion cells; pigment dissolved out by use of solutions of chloral or chloral-glycerin, as well as when essential oils are employed; characteristic color reaction with H_2SO_4, or with boric acid + HCl, and then evaporate with NH_4OH.

214. *Curry Powder.*—A powder of varying composition, but generally find the following: characteristic yellow secretion cells and starch of ginger and curcuma; oil and seed coat of mustard; aleuron and oil secretion reservoirs of coriander; may find sclerenchyma of pimenta or cloves.

** *Crystals of calcium oxalate rosette-shaped and numerous.*

215. *Rheum.*—Crystals 70 μ; starch grains, single, 20 μ, or double 35 x 20 μ; boil a few milligrammes of the powder with water, filter, and to the straw-colored solution add KOH = red coloration.

216. *Tr. Rhei Arom.* (*Co. Powder*).—Chiefly the characteristics of rhubarb (see No. 215); crystals (10 μ), and oil secretion reservoirs of cloves (see No. 222); tissues of cinnamon (see No. 222) and nutmeg (see No. 222).

217. *Tr. Rhei Dulcis* (*Co. Powder*).—Characteristic aleuron, non-secreting hairs and secretion reservoirs of anise; seed coat and crystals of cardamom; crystals in crystal fibres of glycyrrhiza; crystals and starch of rhubarb.

219. *Rhamnus Purshiana.*—Rosette-shaped and cubical crystals; bast fibres (more numerous than in Frangula); stone cells (which are absent

in Frangula); a few milligrammes of powder boiled with water, filtered and the straw-colored filtrate treated with KOH, gives a red color.

*** *Crystals cubical, tetragonal or coffin-shaped and numerous.*

220. *Calumba.*—Stone cells contain tetragonal crystals; starch grains. (See No. 24.)

221. *Glycyrrhiza* (Russian).—Numerous sclerenchyma fibres, adjoining which are crystal fibres containing tetragonal and coffin-shaped crystals; few cork cells, distinguishing it from the Spanish (which see, No. 275); some parenchyma cells contain glycyrrihizin, and are colored straw-yellow with H_2SO_4.

**** *Needle-shaped crystals.*

222. *Angustura.*—Stone cells; bast fibres; long yellow secretion reservoirs; yellowish (oil) and reddish-brown (resin) masses.

II. FEW OR NO FRAGMENTS OF VEGETABLE TISSUES.

A. BURNS, GIVING OFF ODOR OF SO_2.

223. *Sulphur Lotum.*—Small rounded masses in chains.

224. *Sulphur Præcipitatum.*—Small rounded masses in irregular groups in glycerin mount.

B. ON BURNING DO NOT GIVE OFF ODOR OF SO_2.

a NEARLY COLORLESS IN GLYCERIN MOUNT.

225. *Mastic.*—Transparent irregular masses.

b. YELLOWISH IN GLYCERIN MOUNT.

α. Containing oil globules.

226. *Scammonium.*

β Transparent or translucent.

227. *Resina.*—Irregular masses, soluble in cold alcohol (95 per cent.) forming a straw-colored liquid, becoming milky-white on addition of water; on heating fragments of resin in water, they melt, run together and form a sticky mass.

228. *Sandarac.*—Almost insoluble in alcohol (95 per cent.), and solution remains almost colorless: on heating fragments in water, do not melt.

229. *Resina Podophylli.*—Very small, more or less globular particles frequently massed together in large masses.

230. *Aloes (Cape).*—In glycerin mount some fragments are conchoidal; the particles become clear and dissolve, leaving a few colorless lens-shaped or fine acicular crystals. The latter are more abundant in the Barbadoes aloes.

231. *Chrysophanic Acid.*—Small, colorless and yellowish irregular masses; with KOH becomes yellow and then crimson-red.

γ. *More opaque.*

232. *Ammoniac.*—Irregular, faint yellow, opaque masses, made up of small, light-colored or grayish particles.

233. *Gamboge.*—Irregular, bright yellow masses, made up of small yellow particles.

GROUP NO. 4. TAN, BUFF, ECRU TO DARK BROWN OR BROWNISH, BLACKISH AND BLUISH BLACK.

Belladonnæ Radix, Ipecac (Rio), Ulmus, Galla (Aleppo), Canella Alba, Calamus, Quillaja, Physostigma, Wheat Middlings, Elaterium, Althæa, Bryonia, Benzoin, Lappa, Althæa (unpeeled), Apocynum Cannabinum, Apocynum Androsæmifolium, Apocynum Album, Horse-nettle, Hydrangea Arborescens, Pulv. Ipecac. et Opii, Pulv. Jalapæ Co., Asclepias, Jalapa, Colchici Cormis, Quassia, Inula, Aurantii Amari Cortex, Aurantii Dulcis Cortex, Limonis Cortex, Pulv. Morph. Co., Pyrethrum, Aconitum, Podophyllum, Pareira Brava, Rubus, Gelsemium, Euonymus, Ext. Sarsap. Fld. (Co. Powder), Ipecac (Carthagena), Cardamom (seed and capsules), Cardamom, Vanilla and Sugar, Cort. Myricæ Ceriferæ, Lappa, Cusso, Sumbul, Sambucus, Taraxacum, Zingiber (African), Pulv. Glycyrrh. Co., Asafetida (stony), Glycyrrhiza (Spanish), Zingiber (Jamaica), Tr. Gentianæ Co. (Powder), Phytolaccæ Radix, Syr. Pini Albi Co. (Powder), Anthemis, Gossypii Rad. Cortex, Rumex Crispus, Goa Powder, Gentian, Santonica, Valeriana, Cascarilla, Xanthoxylum (Southern), Fœniculum, Tonka, Tobacco (pipe), Sabina, Rosa Centifolia, Chenopodium, Sarsaparilla (American), Xanthoxylum, Aralia Spinosa, Insect Powder (Dalmatian), Viburnum Prunifolium, Aspidosperma, Powd. Opium, Cinnamon (Ceylon), Cinnamon (Saigon), Tr. Cardamomi Co. (Powder), Tr. Lavandulæ Co. (Powder), Aloes and Canella, Ext. Glycyrrhizæ, Tr. Catechu Co. (Powder), Carum, Fœniculum, Pulv. Aromaticus, Coriander, Pimenta, Tobacco (cigar), Colchici Semen, Guarana, Myristica, Caryophyllus, Cinchona Rubra, Sassafras, Quercus Alba, Viburnum Opulus, Cinchona Flava, Tr. Cinch. Co. (Powder), Composition Powder, Prunus Virg., Geranium, Stillingia, Iris, Aloes (Barbadoes), Aloes (Soc.), Hiera Picra (Aloe et Canella), Catechu, Cantharides (Russian), Clove Stems, Cinnamon (Cassia), Conium Fruit, Cubebs, Larkspur Seed, Corn (Smut), Powder of Charcoal + Magnesia + Ginger, Willow Charcoal, Amylum Iodatum.

I. ANIMAL TISSUES.

Fragments on being ignited on platinum foil give off odor of burning animal substance.

A. DO NOT COLOR MOUNTS OF GLYCERIN OR GLYCERIN + CHLORAL.

234. *Cantharis* (*Russian*).—Not hairy.

235. *Mylabris Cichorii.*—Very hairy.

B. GLYCERIN MOUNTS COLORED A CARMINE RED.

236. *Coccus.*

II. PRESENCE OF VEGETABLE TISSUES BUT NO FIBRO-VASCULAR ELEMENTS.

237. *Ergota.*—See No. 1.

III. FIBRO-VASCULAR ELEMENTS AMONG OTHER VEGETABLE TISSUES.

A. CONTAINING STARCH.

a. POSSESSING CALCIUM OXALATE CRYSTALS.

a. Crystals rosette or star-shaped.

238. *Althæa* (*peeled*).—Crystals 25 μ; starch 14 x 10 μ; sclerenchyma fibres; mucilage; crystals of asparagin.

239. *Althæa* (*unpeeled*).—As No. 238, but with appreciable quantity of cork cells.

240. *Aralia Nudicaulis.*—See No. 2.

241. *Aralia Spinosa.*—See No. 3.

242. *Asclepias.*—Crystals 35 μ (sometimes not numerous), starch 7 μ; numerous stone cells.

243. *Cascarilla.*—Crystals 15–20 μ; starch 3 μ; reddish brown secretion cells; sclerenchyma fibres.

244. *Canella Alba.*—Crystals 20–30 μ; starch, single to 3-compound (5 μ in diameter); large yellowish oil secretion reservoirs; peculiar stone cells thickened on but three sides.

245. *Composition Powder.* — Starch, oil cells and crystals of Ginger (See No. 212; crystal and oil secretion reservoirs of cloves (See No. 346); oil and chromoplastids of capsicum (See No. 306); bayberry bark with characteristic crystal fibres and starch grains 7 μ.

246. *Euonymus.*—Crystals 20–35 μ; starch 4 μ; characteristic groups of bast fibres with 5–8 rows of medullary rays.

247. *Galla* (*Aleppo*).—Crystals 10 μ; starch single grains (10 μ) or sometimes in groups; stone cells; test for tannin; crystals of gallic acid.

248. *Geranium.*—Crystals, 60 μ; starch, 10–15 μ; numerous yellowish and reddish-colored masses in cells; strong reaction for tannin.

249. *Gossypii Radicis Cortex.*—Crystals, 25 μ; starch, single (4 μ) to 3 to 4 compound (20 μ) grains; long bast fibres about 6 Mm. long; secretion reservoirs; reddish and yellow-colored masses.

250. *Jalapa.*—Crystals, 30–35 μ; much starch of characteristic form (18–36 μ); yellowish-brown secretion cells, as well as other characteristic, somewhat thickened cell with simple pores.

251. *Juglans.*—Crystals generally rosette-shaped (15–35 μ) or sometimes tetragonal (10 x 15 μ) in shape, occurring in parenchyma or occasionally in crystal fibres; bast fibres, 30 μ wide and very long; stone cells 35 x 50 μ; oily drops and purplish-brown tannin masses in parenchyma. *J. cinerea*, L., is distinguished from *J. alba*, Mx. and *J. nigra*, L., in that each of the latter possess numerous crystal fibres containing prismatic or rhombohedral crystals. *J. nigra* has also in the medullary rays rosette-shaped crystals of calcium oxalate. *Juglans regia* appears more nearly to resemble *J. cinerea*, L. (See Vogl.)

252. *Myrica Cerifera.*—Crystals either rosette-shaped (45 μ) or nearly cubical (15 x 15 μ to 15 x 20 μ), occcurring in crystal fibres (as in licorice) accompanying the long bast fibres, which are as much as 100 μ in width and walls about 25 μ thick; starch either singly (7 μ) or 2 to 4 compound.

253. *Podophyllum.*—Crystals 50 μ in diameter; starch either single grains (5–8 μ), or 2 to 6 compound; numerous single yellow cells or groups of the same; sclerenchyma fibres and ducts.

254. *Pimenta.*—Crystals 15 μ; starch 7–10 μ; stone cells characteristic; oil secretion reservoirs are wine-colored and characteristic.

255. *Pulv. Aloes et Canellæ* (*Hiera Picra*).—In addition to canella alba (see No. 244) there is aloes, the appearance of which depends on the kind used (see Nos. 230, 486 and 487).

256. *Pulv. Jalapæ Co.*—In addition to jalap (see No. 250) has large irregular transparent crystals of potassium bitartrate (see No. 186).

257. *Pulv. Rhei Comp.*—Crystals and starch of rhubarb (see No. 215); oil and starch of ginger (see No. 212), and crystals MgO (see No. 197).

258. *Hufland's Baby Powder.*—Crystals and starch of rhubarb (see No. 215); magnesium carbonate and sugar (as oil-sugar of fennel).

259. *Rubus.*—Crystals 30 μ; starch 7 μ; long bast fibres 7 mm. long; reddish and yellowish-colored masses.

260. *Rumex Crispus.*—Crystals 20–35 μ; starch 10–18 μ; stone cells and sclerenchyma fibres; boil few milligrammes with water, filter and to straw-colored liquid add KOH = red chrysophanic acid reaction. In *Rumex hymenosephalus* starch grains characteristic, 4 x 8 to 7 x 16 μ; apparently no crystals.

261. *Serpentaria.* Sometimes contains crystals (see No. 245).

262. *Stillingia.*—Crystals not numerous apparently (35 μ); starch (15 x 15 to 25 x 30 μ); sclerenchyma fibres very long, diameter, 20 μ; walls swell very perceptibly in KOH; oil secretion cells containing oil and reddish resin masses.

263. *Syr. Trifolii Comp (Powder).*— Rosette crystals, etc., of stillingia

(see No. 262); cubical crystals, stone cells and oil secretion reservoirs of xanthoxylum fraxineum (see No. 29); tissues of lappa (see No. 113); phytolacca (see No. 301); berberis aquifolium (see No. 537); cascara amarga and red clover.

264. *Sarsaparilla* (*American*).—See Aralia nudicaulis, No. 2.

265. *Viburnum Prunifolium.*—Crystals, either rosette-shaped (35 μ) or cubical (15 μ), or somewhat coffin-shaped, occurring in crystal fibres like in licorice; numerous groups of yellowish stone cells (20 x 140 μ) of various shapes; numerous light cork cells; more stone cells and fewer sclerenchyma fibres in V. prunifolium than in V. opulus.

266. *Syr. Pini Albi Co.* (*Powder.*)—See No. 285.

β. Tendency of crystals to cubical, tetragonal, hexagonal or coffin-shape.

267. *Aspidosperma.*—Crystals, 14–25 μ, in crystal fibres about 8 mm. long, very characteristic.

268. *Calamus* (*peeled*).—Few crystals 7 x 10 or 5 x 5 μ in crystal fibres in outer part of cortex; sometimes get large acicular crystals in glycerin mounts about 55 μ long, which may be, however, 400 μ long; starch, 4 x 4 to 4 x 8; parenchyma characteristic; oil secretion cells; ducts and sclerenchyma.

269. *Calamus* (*unpeeled*).—More crystal fibres like in licorice and uva ursi than in the peeled rhizome. (See No. 268.)

270. *Cardamom.*—Crystals very small; starch in small grains, often in groups; thick, dark sclerenchyma being the outer and particularly the inner epidermis of the seed; the pericarp or fruit wall possesses sclerenchyma fibres and large parenchyma cells, some of which contain brown masses. The *Malabar* is distinguished from the *Ceylon* in that the latter has some 1 celled hairs; crystals are larger and more numerous; starch grains are larger; the outer epidermal cells are larger and contain one or more nearly cubical or hexagonal crystals. (See also Vogl and Mœller.)

271. *Cinnamon.*—See No. 292, sometimes find prismatic crystals.

272. *Ext. Glycyrrhizæ.*—Irregular wine-colored fragments; starch grains altered and unaltered; few fragments of sclerenchyma and crystal fibres of glycyrrhiza. (See No. 276.)

273. *Ext. Sarsaparillæ Fld.* (*Co. Powder.*)—Abundance of tissues and starch grains of sarsaparilla (see No. 40): sclerenchyma and crystal fibres of glycyrrhiza (see No. 275); tissues of sassafras (see No. 313); and mezereum (see No. 524).

274. *Frangula.*—Rosette-shaped crystals, 70 μ, cubical, pentagonal and hexagonal crystals (7 x 5 μ to 8 x 8 μ) in parenchyma cells or crystal fibres; starch grains not numerous, the grains occurring either singly or in groups; long, numerous bast fibres 15 μ wide; after section or powder remains in glycerin numerous small globular and yellowish particles separate; upon boiling a few milligrammes of the powder with water, filtering,

and adding to the straw-colored liquid KOH, becomes red colored. Absence of stone cells in frangula distinguish it from rhamnus purshiana.

275. *Gelsemium.*—Crystals cubical (15 x 15 μ) or tetragonal (15 x 20 μ) or prismatic 8 x 28 μ, starch grains 8 x 8 μ; numerous sclerenchyma fibres. Stem is distinguished from the root by the presence of groups of more or less altered sieve (*i. e.*, internal phlœm). Rhizome is distinguished from overground stem by the former having a stronger cork development and the latter more chloroplastids.

276. *Glycyrrhiza (Spanish).* — Crystals of varying shapes, about 3 x 2 μ, occurring in crystal fibres in fragments of about 117 μ in length; starch grains about 5 μ in diameter; ducts and numerous sklerenchyma fibres. Spanish licorice is distinguished from the Russian in that a powder of the former is darker, due to the fact that the cork is retained and therefore cork cells are relatively more numerous.

277. *Ginger, Charcoal and Magnesia.*—Few starch and oil secretion cells of ginger (see No. 212); crystals of MgO (see No. 197), and large number of wine colored or blackish wood fragments.

279. *Iris.*—Crystals of shape like those of quillaja; they arise in the intercellular spaces, and in powder are in broken pieces about 20 x 150 μ in size; parenchyma loose; cells contain reddish resin; ducts numerous.

280. *Krameria.*—Large crystals in shape like quillaja, ranging from 10 x 45 to 25 x 110 μ, or even larger; starch 20–30 μ; bast fibres 400 to 875 μ long; about 15 μ wide and with a peculiar crook or bend; parenchyma containing bright, reddish-brown coloring substance. Bast in Savanilla rhatany longer and broader than Peruvian (see also Vogl).

281. *Myrica Cerifera.*—See No. 252.

282. *Prunus Virginiana.*—Crystals rosette-shaped, cubical or hexagonal (20–30 μ); starch 4 μ; stone cells; bast fibres; taste and odor.

283. *Pulv. Glycyrrhizæ Co.*—Tissues of glycyrrhiza (see No. 275), and senna (see No. 21). Make chrysophanic acid test.

284. *Quillaja.*—Crystals prismatic, varying from 15 x 60 to 35 x 100 μ, or even larger; starch 10 μ; sclerenchyma fibres; parenchyma with yellowish resin.

285. *Syr. Pini Albi Co.* (*Powder*)—Crystals, fibres and stone cells of wild cherry (see No. 281); characteristic crystals, etc., of aralia spinosa (see No. 3); tissues of sassafras (see No. 313), sanguinaria (see No. 222), white pine bark and balm of gilead buds.

286. *Ulmus.*—Hexagonal or coffin-shaped crystals 8 x 25 μ; starch 5–7 μ; groups of bast fibres and characteristic large mucilage cells.

287. *Viburnum Opulus.*—Crystals cubical (2 x 2 μ) or broadly prismatic (10 x 20 μ) in crystal fibres. More sclerenchyma fibres in V. opulus than in V. prunifolium. (See No. 265.)

288. *Viburnum Prunifolium.*—See No. 265.

289. *Xanthoxylum.*—Tetragonal crystals 10 x 25 μ; starch 4–10 μ;

large colorless secretion reservoirs; reddish cork; acicular crystals separate in glycerin mounts; apparently no bast or stone cells as in X. fraxineum. (See Mœller.)

γ. *Raphides* (*or needle-shaped crystals*) *of calcium oxalate.*

290. *Cacao.*—Acicular crystals of theobromine and fat. (See No. 545.)

291. *Calamus.*—Acicular crystals in glycerin mount. (See No. 268.)

292. *Cinnamon.*—Raphides of calcium oxalate; stone cells; bast fibres; starch grains. The different cinnamons are distinguished in powder in that the *Ceylon* has little or no cork; *Cassia* has more lignified cells than *Saigon; Saigon* is more aromatic and pungent. The mounts of Ceylon cinnamon are lighter in appearance than those of either of the others. Regarding other characteristics, the following may be of some service in distinguishing these barks; *Cassia* has, on an average, starch grains 7 μ diameter; stone cells 60 μ wide; bast fibres 700 μ long; *Ceylon* has starch grains 3–7 μ diameter; stone cells 70 μ wide; bast fibres 60–100 μ long; *Saigon* has starch grains 10 μ diameter; stone cells 85 μ wide; bast fibres 750 μ long.

293. *Hydrangea Arborescens.*—Needles 200 μ long; starch 4–15 μ; numerous sclerenchyma fibres.

294. *Ipecac.*—Acicular crystals 20–40 μ long; starch in single and 2–3 compound grains; tracheids, but no true ducts. Starch grains of Rio Ipecac on average 4–7 μ, may be 14 μ; that of *Carthagena* varies from 4–15 μ, the grains being uniformly larger. *Richardsonia* has true ducts.

295. *Pulv. Aromaticus.*—Tissues and cell-contents of cinnamon (see No. 292) and ginger (see No. 212) predominating; also cardamom (see No. 23) and nutmeg (see No. 496.)

296. *Pulv. Ipecac. et Opii.*—Crystals of sugar of milk predominating (see No. 190); also ipecac (see No. 294) and opium (see No. 222).

297. *Tr. Catechu Comp.* (*Powder*).—Tissues, etc., of cinnamon (see No. 292) and catechu (see No. 222).

δ. *Crystal sand.* (*May occur as acicular crystals also*).

298. *Belladonnæ Radix.*—Starch in single (5–15 μ) and 2–3-compound grains; rather narrow ducts, with bordered pores; few sclerenchyma fibres; grayish-brown resinous matter. Woody belladonna has more numerous ducts and sclerenchyma fibres. Mealy b. is richest in starch, and horny b. is richest in grayish-brown resinous masses.

299. *Cinchona.*—Starch 4 μ in diameter, not very abundant; characteristic bast-fibres 600 μ long by 50 μ wide; alkaloids can be crystallized out sometimes by use of KOH.

300. *Horse-nettle (Solanum Carolinense)*—Starch occurs in single (25 x 35 to 10 x 20 μ) or 2–4 compound grains; sclerenchyma and ducts.

301. *Phytolaccæ Radix.*—Acicular crystals 30 μ long or crystallized; numerous starch grains 7–18 μ in diameter; large ducts; fragments of cork; sclerenchyma fibres short and long.

302. *Quassia (Surinam).*—See No. 358.

303. *Tinct. Cinchonæ Comp. (Powder).*—Bast-fibres of cinchona (see No. 299) : parenchyma of bitter orange peel (see No. 206) ; sclerenchyma of serpentaria (see No. 145).

304. *Zingiber* (*African*).—See No. 318.

B. CONTAINING STARCH, BUT FEW OR NO CRYSTALS OF CALCIUM OXALATE AND RATHER NUMEROUS FRAGMENTS OF TISSUES.

α. Possessing oil-cells or secretion reservoirs ∴ of characteristic odor.

305. *Calamus* (*unpeeled*).—The crystal fibres occur only in outer portions of cortex, hence powder may contain few ; starch 4 x 8 to 4 x 4 μ ; ducts and sclerenchyma ; loose parenchyma ; colorless or slightly yellowish oil-secreting cells.

306. *Capsicum.*—Starch grains very small ; peculiar wavy stone-cells of seed, besides stone-cells of epicarp and endocarp ; oil containing dissolved pigment of chromoplastids ; characteristic secretion hairs of calyx ; powder with H_2SO_4 becomes purplish and then purplish-red.

307. *Colchici Semen.*—See No. 326.

308. *Cubeba.*—Starch 1–4 μ in diameter ; occurring also in aggregated masses : stone-cells (50 x 50 μ), those of endocarp twice as long as wide ; sclerenchyma fibres ; needle-shaped crystals (cubebin) occur in stalk ; much oil in numerous oil secretion reservoirs.

309. *Cinnamon.*—Crystals may not be observed. (See No. 292.)

310. *Piper Nigrum.*—See No. 100.

311. *Sabina.*—Starch 4 μ ; characteristic hypodermis consisting of long fibres (15 μ wide) associated with epidermis.

312. *Sanguinaria.*—Starch grains single (4–8 μ), seldom 2–4-compound ; orange and reddish-colored secretion cells ; mounts in glycerin are apt to contain sphere crystals.

313. *Sassafras.*—Starch grains single and 1–3-compound (7–20 μ diameter) ; bast fibres 455 μ long by 20–30 μ wide, being spindle-shaped much as in cinchona ; yellowish and purplish-yellow fragments containing tannin ; oil-cells.

314. *Stillingia.*—Crystals may not be numerous. (See No. 262.)

315. *Sumbul.*—See No. 125.

316. *Syr. Trifolii Comp. (Powder).*—See No. 263.

317. *Valeriana.*—Starch in single (7 μ) or 2–3-compound grains ; oil in cells near hypodermis ; peculiar cork ; root hairs ; sometimes in cells of epidermis or near them crystals (valerianic acid salt) occur.

318. *Zingiber* (*African*).—Crystals likely to be overlooked. Distinguished from Jamaica ginger by possessing more numerous oil and resin cells and cork cells.

β. Sclerenchyma as stone cells or fibres.

319. *Aconiti Radix.*—Starch in single (4–12 μ) and compound grains,

much resembling colchicum corm; tabular stone cells; ducts; reddish-brown endodermis; taste characteristic.

320. *Apocynum.*—Starch; sclerenchyma and laticiferous vessels; ducts with bordered pores. In *A. album* starch 4–10 μ; stone cells 35 x 70 to 50 to 70 μ, with few large pores; bast fibres may not react readily, if at all, with phloroglucin; wood fibres react with phloroglucin; thick cork. In *A. androsæmifolium* starch 4–20 μ; stone cells 13 x 10 μ, possessing numerous fine pores; bast fibres may be absent; when present, behave towards phloroglucin like *A. album.* In *A. Cannabinum* do not find stone cells or bast fibres; wood fibres are affected by phloroglucin; starch grains 7 x 15 to 10 x 10 μ, being larger than the other two; more numerous yellowish or nearly colorless fragments of laticiferous vessels than in the other two; numerous fragments of the yellowish and reddish-brown cork.

321. *Black Mustard Hulls.*—Characteristic stone cells and pigment cells of seed coat.

322. *Capsicum.*—See No. 306, stone cells.

323. *Chenopodium.*—See No. 108, stone cells.

324. *Coffee.*—Characteristic fragments of seed coat made up of parenchyma and spindle-shaped stone cells (175–200 μ long and 35 μ wide); most of the cells are those of endosperm with brownish-colored walls, porous, 10 μ thick and contain oil, aleuron and starch. In commerce, ground coffee is either made from the true coffee seed, or is an artificial mixture of cereals, chicory, etc.

325. *Colocynthis.*—See No. 549.

326. *Colchici Semen.* — Starch 7–15 μ; characteristic thick-walled endosperm cells with simple pores and containing oil globules and protein; reddish-brown fragments of seed coat, the brown coloring matter soluble in KOH.

327. *Cubeba.*—See No. 308.

328. *Guarana.*—Parenchyma (60 x 70 μ) containing aggregated more or less altered starch grains (10 x 10 μ); stone cells (25 μ in diameter) nearly isodiametric; sclerenchyma fibres; on addition of KOH needle-shaped crystals (caffeine) may be obtained.

329. *Pareira.*—Yellowish stone cells (70 x 45 μ) occurring in groups; numerous starch grains, either single (7 x 10 to 15 x 15 μ) or compound; wood fibres.

330. *Physostigma.*—Starch 25 x 40 μ; stone cells, also characteristic palisade sclerenchyma; stone cells, the contents of which are reddened by alkalies; oil and protein as granular masses.

331. *Phytolaccæ Radix.*—See No. 301.

332. *Podophyllum.*—Crystals sometimes apparently wanting; starch in single (5–8 μ) or 4 to 6 compound grains; numerous single cells or groups with yellowish resin; sclerenchyma fibres and ducts.

333. *Sassafras.*—See No. 313.

334. *Serpentaria.*—See No. 145.

C. CONTAINING STARCH; FEW TISSUE FRAGMENTS AND NO CALCIUM OXALATE CRYSTALS.

335. *Amylum Iodatum.*—More or less angular grains (7–20 μ) of corn starch, colored uniformly dark blue; on focusing above on the grain the edge is light blue.

336. *Bryonia.*—Starch in single (10–17) or two or more compound grains; sometimes find long acicular crystals (200 μ); ducts, 35–60 μ wide; cork yellow and yellowish-colored cells, associated with ducts as in colchicum corm; with H_2SO_4 powder colored purplish and reddish-brown.

337. *Colchici Cormis.*—Starch in single (7–15 μ) and 2 to 4 compound (35 x 35 μ) grains; sometimes find needle-shaped crystals (70–200 μ long); few spiral ducts (21 μ wide); with H_2SO_4 powder colored reddish-brown (port wine color).

338. *Opium.*—In glycerin mounts consists of more or less grayish-brown and irregular granular masses (35–50 μ in diameter); little or no starch; epidermis of capsule cells (40 x 40 μ in width, having lumen 7 x 7 μ); taste bitter and sparingly soluble in water or KOH. May get test for alkaloids with use of KOH. The *Smyrna* opium has most epidermal cells of capsule; the *India* few or none, and the *Persian* very few. The *Persian* always has an appreciable amount of starch. See also Tschirch.

339. *Tonka.*—Numerous starch grains, either single (5 x 7 μ) or aggregated; parenchyma containing brownish-red coloring substance; much oil.

II. WITH LITTLE OR NO STARCH.

A. CONTAINING CALCIUM OXALATE CRYSTALS.

a. Crystals Rosette or Star-shaped.

340. *Anisum.*—See No. 8.

341. *Carum.*—Crystals (1 μ) in aleuron (3 μ); characteristic brownish oil secretion reservoirs and epidermis of seed coat and pericarp.

342. *Chimaphila.*—See No. 12.

343. *Conium.*—See No. 13.

344. *Coriander.*—Crystals (3 μ) in aleuron (10 μ); light yellowish oil secretion reservoirs, with epidermis of seed coat and pericarp.

345. *Cusso.*—Crystals (20 μ); spherical pollen grains (25 μ); single celled, non-secreting hairs (210 μ long); small secretion hairs with a stalk; stone cells.

346. *Cloves.*—Crystals, 10–15 μ; numerous secretion reservoirs (125 x 125 μ to 120 x 210 μ;) pollen grains somewhat triangular (15 μ); parenchyma loose; few bast fibres in the bundle. Heat powder with KOH get needle-shaped crystals, possibly eugenol.

347. *Clove Stems.*—Numerous rosette-shaped, but also cubical (7 x 7 μ) crystals; sclerenchyma fibres 30 μ wide; numerous stone cells (30 x 100 μ to 100 x 100 μ); oil secretion reservoirs not so large or numerous as cloves.

348. *Fœniculum.*—Crystals (2 μ) aleuron 6 μ; brownish oil secretion reservoirs with characteristic inner epidermis of pericarp running at right angles to the same; thickened latticed parenchyma.

349. *Quassia* (Surinam).—See No. 358.

350. *Santonica.*—Crystals 10 μ; pollen grains, spherical (15 μ); sclerenchyma fibres; secretion hairs containing crystals (santonin) soluble in alcohol and ether; powder, with H_2SO_4, becomes immediately blood-red. Santonica distinguished from Artemisia by the characteristic T-non-secreting hairs of the latter.

β. *Crystals cubical, tetragonal or prismatic.*

351. *Aurantii Amari Cortex.*—See No. 206.

352. *Aurantii Dulcis Cortex.*—See No. 207.

353. *Gaultheria.*—See No. 17.

354. *Gentian.*—Contains some small colorless or yellow prismatic crystals (may be calcium oxalate); in glycerin large prismatic crystals (5 x 15 μ) separate (possibly a sugar); spiral (30 μ wide), and scalariform (50 μ wide) ducts; yellowish oil globules; powdered with Fe_2Cl_6 dark brown; characteristic "Ersatzfasern" accompanying the sieve.

355. *Hamamelis.*—See No. 33.

356. *Illicium.*—Prismatic crystals (4–10 μ) of a stearopten in inner epidermis of seed coat; most characteristic are the sclerenchyma, of which there are 3–4 forms, of these the palisade sclerenchyma is most characteristic; loose parenchyma; oil in cells. In *I. religiosum* the stone cells are thicker than *I. anisatum*, and on treatment with KOH the latter becomes port-wine red, and the former a dirty orange-brown.

357. *Insect Powder.*—See No. 19.

358. *Limonis Cortex.*—See No. 208.

359. *Quassia.*—Cubical crystals (15 μ) in wood parenchyma; ducts and wood fibre. The Jamaica quassia is distinguished from Surinam, in that the medullary rays of the former are 2–3 rows wide, whereas in the Surinam they are but 1 row wide. In the *Jamaica* we also find in addition crystal sand. When bark is ground with the wood the *Surinam* powder is distinguished by the presence of stone cells and rosette-shaped crystals of calcium oxalate. The latter are found only to a small extent in the *Jamaica.*

360. *Quercus Alba.*—Cubical crystals (15 μ), in crystal fibres 20 μ wide; large groups of characteristic stone cells; long bast fibres, which are 40 μ wide; colorless or light yellow parenchyma stained deep black with Fe_2Cl_6.

361. *Sambucus.*—Small crystals in calyx. See No. 474.

362. *Uva Ursi.*—See No. 37.

363. *Vanilla.*—Crystals, tetragonal and prismatic (7 x 17; 10 x 25; 7 x 35 μ) or needle-shaped (200–300 μ long); characteristic papillæ upon inside of pericarp; characteristic broadly ovate, brown or brownish-black seeds with reticulate walls; lignified elements stained bright-red with phloro-

glucin; starch not found in ripe fruit. Mexican vanilla has in connection with the elements of the fibro-vascular bundle, a characteristic netted-pored parenchyma cell, distinguishing it from the other vanillas. Vanilla distinguished from admixtures with *tonka* by latter containing starch.

γ. *Crystals in raphides.*

364. *Vanilla.*—See No. 363.

B. CRYSTALS IN FINE SAND-LIKE PARTICLES.

365. *Cinchona.*—Contains small amount of starch. See No. 299.

366. *Quassia* (Jamaica).—See No. 358.

367. *Tobacco.*—Characteristic secreting and non-secreting hairs; sclerenchyma fibres; stomata characteristic.

C. NO STARCH OR CRYSTALS OF CALCIUM OXALATE, BUT MASSES OR CRYSTALS OF A CARBOHYDRATE (INULIN).

The *Inulin* occurs in numerous irregular nearly transparent or grayish fragments, sometimes perfect sphere-crystals. These masses or crystals are soluble in hot water; insoluble in alcohol and glycerin.

368. *Inula.* Grayish-brown masses from secretion reservoirs; few sklerenchyma fibres (15 μ wide); reticulated ducts 32 μ wide: odor and taste.

369. *Lappa.*—Apparent absence of secretion reservoirs; more wood fibres and possibly larger reticulated ducts (as much as 70 μ wide) than inula; cells of periderm brownish, becoming yellow with age; parenchyma very light-colored; no odor.

370. *Pyrethrum.*—Characterized by a stone cork (30 x 45 μ) with yellowish-brown contents; few sclerenchyma fibres; narrow reticulated ducts about 15 μ wide; characteristic parenchyma; oil secretion reservoirs; taste.

371. *Taraxacum.*—Characteristic milk vessels in chloral-iodine mount. See No. 165.

III. POSSESSING SECRETION HAIRS, CELLS OR RESERVOIRS, THEREFORE WITH SOMEWHAT CHARACTERISTIC ODOR.

A. SECRETION HAIRS.

372. *Anthemis.*—Non-secreting and secreting hairs; spherical prickly pollen grains (32 μ) which may not be numerous; papillæ of corolla and stigma; sclerenchyma fibres (10 μ wide) the walls of which are very much thickened; small rosette-shaped calcium oxalate crystals sometimes found; characteristic cells of anther.

373. *Arnicæ Flores.*—Numerous spherical prickly pollen grains (30 μ); secretion hairs; sclerenchyma fibres; characteristic non-secreting hairs of pappus (like top of pineapple fruit); outer portions of corolla and ovary.

374. *Belladonnæ Folia.*—See No. 46.

375. *Cusso.*—See No. 345.

376. *Lupulin.*—Large characteristic secretion hairs (20 x 20 μ). In *fresh* lupulin more light yellow-colored secretion hairs than in *old.* In latter there are brown or grayish-brown reservoir masses replacing the light-yellow oil. The amount of *humulus* fragments should not be too large in good quality. See No. 537.

377. *Santonica.*—See No. 350.

B. SECRETION CELLS OR RESERVOIRS.

378. *Aurantii Amari Cortex.*—See No. 206, crystals of calcium oxalate.

379. *Aurantii Dulcis Cortex.*—See No. 207, crystals of calcium oxalate.

380. *Inula.*—See No. 368, Inulin masses or crystals.

381. *Limonis Cortex.*--See No. 208, crystals of calcium oxalate.

382. *Macis.*—A peculiar starch (becomes red with iodine and called "dextrin starch") in small irregular particles; yellowish (oil) and reddish (resin) secretion cells (75 μ); few ducts; H_2SO_4 stains contents of secretion cells bright red; KOH stains contents of secretion cells yellow. Bombay mace gives with H_2SO_4 a yellowish reaction; the oil secretion cells and "dextrin starch" grains are possibly larger, the epidermal cells are radially elongated and the collenchymatic layer underneath may be wanting in Bombay mace.

383. *Pyrethrum*—Stone cork. See No. 370.

IV. PRESENCE OF SCLERENCHYMA CELLS (STONE CELLS) OR FIBRES (BAST OR WOOD).

A. STONE CELLS.

384. *Aconiti Radix.*—Starch. See No. 319.

385. *Asclepias.*—Crystals and starch. See No. 242.

385a. *Black Mustard Hulls.*—Chiefly fragments of seed coat.

386. *Cocoa Shells.*—Little or no starch; oil globules: characteristic brownish adhesive fragments, possessing more or less hexagonal epidermal cells; peculiar small tabular mucilage cells and a layer of nearly isodiametric stone cells (10 x 10 μ) the walls of which are 4 μ thick.

387. *Canella Alba.*—Crystals, starch, secretion reservoirs. See No. 244.

388. *Capsicum.*—Small starch grains might not be observed; reddish-colored oily drops; peculiar wavy cells of seed coat, besides stone cells of epicarp and endocarp; secretion hairs of calyx; powder with H_2SO_4 becomes purplish, changing to purplish-red.

389. *Cardamom.*—Starch and crystals. See No. 270.

390. *Clove Stems.*—The presence of stone cells distinguish it from cloves. See No. 347.

391. *Coffee.*—Oil, aleuron, starch and epidermis with spindle-shaped stone cells. See No. 324.

392. *Colchici Semen.*—Starch, oil and protein. See No. 326.

393. *Colocynthis.*—Stone cells (70 x 50 μ) of fruit, the walls of which are 15 μ thick; also fine characteristic yellowish, nearly isodiametric stone cells of seed containing very thick walls and but little lumen; embryo contains oil and aleuron. The *amount of seed* in powder can be determined from the amount of oil in the form of globules. The United States Pharmacopœia directs only pulp, and not seeds or epicarp.

394. *Composition Powder.*—Tissues of ginger, cloves, capsicum and bayberry. See No. 245.

395. *Cubeba.*—Starch and secretion reservoirs. See No. 308.

396. *Delphinium* (*Larkspur Seed*).—No starch; oil and protein; characteristic stone cells (32 x 175 μ) being the inner epidermis and containing a reddish-brown coloring substance; also spatulate cells (outer epidermis of seed coat) with simple pores.

397. *Galla.*—Crystals and starch. See No. 247.

398. *Guarana.*—Starch. See No. 328.

399. *Hiera Picra.*—Aloes and Canella. See No. 255.

400. *Illicium.*—Palisade sclerenchyma. See No. 356.

401. *Jalapa.*—Crystals and starch. See No. 250.

402. *Juglans.*—Crystals and oil. See No. 251.

403. *Pareira.*—Starch. See No. 329.

404. *Prunus Virginiana.*—Starch and crystals. See No. 282.

405. *Pulv. Jalapæ Comp.*—Jalap and Potassii Bitartras. See No. 256.

406. *Quercus Alba.*—Crystals and tannin. See No. 360.

407. *Pimenta.*—Crystals, starch and oil. See No. 254.

408. *Pyrethrum.*—Inulin and stone cork. See No. 370.

409. *Rumex Crispus.*—Crystals and starch. See No. 260.

410. *Syr. Trifolii Comp.* (*Powder*).—Tissues of stillingia, xanthoxylum fraxineum, lappa, phytolacca, berberis aquifolium, cascara amarga and red clover. See No. 263.

411. *Vanilla.*—No starch. See No. 363.

412. *Viburnum Prunifolium.*—Crystals, more stone cells and fewer sclerenchyma fibres. See No. 265.

B. SCLERENCHYMA FIBRES.

413. *Althæa.*—Crystals, starch and mucilage. See No. 238.

414. *Anthemis.*—Pollen. See No. 372.

415. *Apocynum.*—Starch. See No. 320.

416. *Arnicæ Flores.*—Pollen. See No. 373.

417. *Aspidosperma.*—Crystals in crystal fibres. See No. 267.

418. *Belladonnæ Radix.*—Starch. See No. 298.

419. *Cardamom.*—Crystals and starch. See No. 270.

420. *Cascarilla.*—Crystals and starch. See No. 243.

421. *Cinchona.*—Characteristic bast fibres. See No. 299.

422. *Cinnamon.*—Starch, crystals and stone cells. See No. 292.

423. *Cloves.*—Few sclerenchyma fibres and numerous large secretion reservoirs. See No. 346.

424. *Clove Stems.*—Stone cells, numerous sclerenchyma fibres. See No. 347.

425. *Cubeba*—Starch, oil, stone cells. See No. 308.

426. *Euonymus.*—Crystals and starch. See No. 246.

427. *Ext. Glycyrrhizæ.*—See No. 272.

428. *Ext. Sarsaparillæ Fld.* (*Co. Powder*).—Tissues of sarsaparilla, glycyrrhiza, sassafras and mezereum. See No. 273.

429. *Frangula.*—Crystals, starch, but *no* stone cells. See No. 274.

430. *Gelsemium.*—Crystals and starch. See No. 275.

431. *Ginger, Charcoal and Magnesia.*—Tissues of ginger, willow and particles of MgO. See No. 277.

432. *Glycyrrhiza.*—Crystals and starch. See No. 276.

434. *Gossypii Rad. Cortex.*—Crystals, starch and secretion reservoirs. See No. 249.

435. *Hydrangea.*—Crystals and starch. See No. 293.

436. *Illicium.*—Palisade sclerenchyma. See No. 356.

437. *Inula.*—See No. 368.

438. *Ipecac.*—Crystals and starch. See No. 294.

439. *Juglans.*—Crystals, oil and tannin. See No. 251.

440. *Krameria.*—Crystals, starch and coloring substance. See No. 279.

441. *Lappa.*—Inulin. See No. 369.

442. *Myrica Cerifera.*—Crystals in crystal fibres. See No. 252.

443. *Pareira.*—Starch and numerous stone cells. See No. 329.

444. *Phytolaccæ Radix.*—Crystals and starch. See No. 301.

445. *Podophyllum.*—Crystals and starch. See No. 332.

446. *Prunus Virginiana.*—Crystals and starch. See No. 282.

447. *Pulv. Aromaticus.*—Tissues of cinnamon, ginger, cardamom and nutmeg. See No. 295.

448. *Pulv. Glycyrrhizæ Comp.*—Tissues of glycyrrhiza and senna. See No. 283.

449. *Pulv. Ipecac. et Opii.*—Tissues of ipecac and opium; also crystals of sugar of milk. See No. 296.

450. *Pyrethrum.*—Inulin, stone cork. See No. 370.

451. *Quassia.*—Crystals. See No. 359.

452. *Quercus Alba.*—Crystals and stone cells. See No. 360.

453. *Quillaja.*—Crystals and starch. See No. 284.

454. *Rubus.*—Crystals and starch. See No. 259.

455. *Rumex Crispus.*—Crystals, starch and stone cells. See No. 260.

456. *Sabina.*—Starch and hypodermis fibres. See No. 311.

457. *Sassafras.*—Starch, oil and tannin. See No. 313.

458. *Serpentaria.*—Starch. See No. 145.

459. *Stillingia.*—Crystals, starch and oil. See No. 262.

460. *Sumbul.*—Starch and oil. See No. 125.

461. *Syr. Pini Albi Comp.* (*Powder.*)—Tissues of wild cherry, aralia spinosa, sassafras, sanguinaria, white pine bark and balm of gilead buds. See No. 285.

462. *Tr. Cinchonæ Comp.* (*Powder.*)—Tissues of cinchona, bitter orange peel and serpentaria. See No. 303.

463. *Ulmus.*—Crystals, starch and mucilage. See No. 285.

464. *Viburnum Opulus.*—Crystal fibres and sclerenchyma fibres. See Nos. 287 and 265.

465. *Willow Charcoal.*—In glycerin mounts, wine-colored or dark reddish or blackish irregular-shaped fragments containing wood fibres; transverse fragments with lumen.

466. *Xanthoxylum.*—Crystals, starch and oil. See No. 289.

V. ABSENCE OF SCLERENCHYMA.

467. *Gentian.*—Yellowish oil globules; spiral (30 μ wide), and scalariform (50 μ wide) ducts; small colorless and yellow prismatic crystals (which may be calcium oxalate crystals); large (5 x 15 μ) prismatic crystals separate in glycerin mounts, which may be a sugar; characteristic "Ersatzfasern" accompanying the sieve.

VI. CHARACTERISTIC POLLEN GRAINS.

468. *Anthemis.*—See No. 372.

469. *Arnicæ Flores.*—See No. 373.

470. *Carthamus.*—Glycerin of mount colored yellow; numerous elliptical, prickly pollen grains, which are more or less elliptical (50 x 60 μ); brick-red secretion vessels; cells of anther; hairs of stigma; chaff or pappus.

471. *Caryophyllus.*—See No. 346.

472. *Crocus.*—Glycerin of mount colored deep orange; few nearly smooth, and nearly spherical pollen grains (85–100 μ); papillæ of stigma; coloring principle soluble in water and not in fatty oils, being the reverse in capsicum; with H_2SO_4 fragments become blue immediately.

473. *Rosa Centifolia.*—Pollen grains nearly smooth and elliptical (17 x 30 μ); fragments of corolla pinkish with chloral; papillæ of corolla are somewhat rounded; cells of anther; long, 1-celled fibres around ovary and akenes being 875 μ long and 10 μ wide. In *rosa gallica* the pollen grains are ovate (28 x 32 μ) rather than elliptical; the papillæ of corolla are acute rather than rounded; absence of many anthers or fibre-like hairs of ovary.

474. *Sambucus.*—No starch; numerous smooth, nearly spherical pollen grains (18 x 18 μ); numerous fragments of broken or whole anthers; corolla with dentate papillæ; oil globules from secretion cells; in calyx some rosette-shaped crystals of calcium oxalate; in flower stalk large spiral duct (30 μ wide), and parenchyma with brown contents.

475. *Santonica.*—See No. 350.

VII. LITTLE OR NO INDICATION OF PLANT TISSUES.

A. CONTAINING STARCH.

476. *Amylum Iodatum.*—See No. 335.

477. *Bryonia.*—See No. 336.

478. *Colchici Cormis.*—See No. 337.

479. *Ext. Glycyrrhizæ.*—Irregular, wine-colored fragments; altered and unaltered starch grains; few fragments of bast and crystal fibres of glycyrrhiza; soluble in water and taste sweetish.

480. *Opium.*—Insoluble in water; taste bitter. See No. 338.

B. WITHOUT STARCH.

a. PARTICLES OF ORGANIZED FORM.

481. *Corn Smut.*—Grayish-brown, nearly spherical spores (7 x 7 μ); little or no foreign substances. Spores of *Coprinus comatus*, blackish and elliptical (10 x 5 μ). Spores of *Agaricus campestris*, more brownish than corn smut, are egg-shaped and in size about 5 x 7 μ.

b. PARTICLES OF INORGANIC FORM.

α. Remain Opaque (not affected) in Glycerin.

482. *Aloes (Socotrine).*—Partially unaffected. See No. 487.

483. *Benzoin.*—Colorless and wine-colored irregular fragments; some rosette-shaped groups and collection of small tetragonal or plates of crystals. Upon covering a fragment on a slide with a watch crystal and cautiously heating, crystals of benzoic acid are sublimed on the watch crystal.

484. *Elaterium.*—Grayish and grayish-brown, more or less opaque and irregular fragments. Heat fragment with phenol, and when cool add H_2SO_4, a deep red coloration is produced. KOH has apparently no action on elaterium.

485. *Goa Powder.*—Small, somewhat transparent, wine colored, irregular angular fragments. With KOH a bright, reddish color is produced.

β. Become More or Less Transparent in Glycerin.

486. *Aloes (Barbadoes).*—In a glycerin mount the particles become clear and behave like Cape aloes, but generally numerous acicular or large

prismatic crystals remain or separate in clear yellow space where fragment of aloes was originally.

487. *Aloes* (*Socotrine*).—In a glycerin mount the fragment is not very perceptibly affected. At the most there is but a faint yellowish color around the grayish or grayish-brown masses. In old Socotrine aloes the gray masses look like rosette crystals.

488. *Catechu.*—Large opaque dark brownish red masses, which on the edge gradually become transparent and dissolve with a sherry-wine color, also fragments of sclerenchyma.

489. *Kino.*—Fragments become clearer and a deeper red (port wine color) compared to catechu.

GROUP NO. 5. COLOR REDDISH.

Kino, Cochineal (black), Cochineal (gray), Lupulin (old), Macis, Myristica, Capsicum, Crocus, Carthamus, Santalum Rubrum, Krameria, Sanguinaria, Pine Shavings, Breakfast Cocoa, Illicium, Sassafras, Lupulin (new), Rosa Gallica, Pulv. Rhei Comp., Hufland's Baby Powder.

I. ANIMAL FRAGMENTS (TEST BY BURNING).

490. *Cochineal.*—Carmine red color to mounts of glycerin or glycerin + chloral.

II. VEGETABLE FRAGMENTS.

A. CONTAINING STARCH.

a. CONTAINING CALCIUM OXALATE CRYSTALS.

491. *Krameria.*—See No. 279.

492. *Hufland's Baby Powder.*—Fragments of rhubarb, MgO and sugar. See No. 278.

493. *Pulv. Rhei Comp.*—Fragments of rhubarb, ginger and MgO. See No. 257.

b. FEW OR NO CALCIUM OXALATE CRYSTALS.

494. *Cocoa.*—See No. 386.

495. *Capsicum.*—See No. 306.

496. *Myristica.*—Starch grains (5–7 μ) generally in groups; numerous oil globules; parenchyma and "hullperisperm," with reddish colored contents; in "hullperisperm" some prismatic crystals; some tetragonal or prismatic crystals (5 x 10 μ) of myristic acid, which are soluble in KOH; heat powder in chloral to get tabular or acicular crystals. Myristica distinguished from mace in that latter has no starch, and on treatment with KOH the secretion cells of mace are colored blood-red, whereas myristica becomes brownish.

497. *Sanguinaria.*—See No. 312.

498. *Sassafras.*—See No. 313.

B. WITH LITTLE OR NO STARCH.

a. CONTAINING CALCIUM OXALATE CRYSTALS.

499. *Coca.*—See No. 30.

500.—*Illicium.*—See No. 356.

501. *Santalum Rubrum.*—Hexagonal or coffin-shaped crystals (15 x 25 μ) in crystal fibres; long sclerenchyma fibres, 10 μ wide, ducts (150 μ wide) with bordered pores; all cell walls colored yellowish-red; some cells contain reddish granular resin-like masses. Distinguished from other woods possessing red dye in having only one row of medullary ray cells (in hæmatoxylon the medullary rays are 4–5 cells in width) and coloring matter not dissolved by water.

III. NO VEGETABLE OR ANIMAL TISSUES.

502. *Kino.*—See No. 489.

GROUP NO. 6. CONTAINING POWDERS THAT ARE RELATIVELY COARSE.

Sugar (granulated), Sago (imitation), Sago (real), Grits (corn), Corn Bran, Quillaja, Orris Root (Florentine), Viburnum Opulus, Sarsaparilla (Mexican), Sarsaparilla (Honduras), Taraxacum, Mezereum, Strophanthus, Linum, Dulcamara, Sinapis Nigra, Humulus, Matricaria, Triticum, Sassafras Medulla, Sweet Orange Peel, Terebinthina, Manna, Canella Alba, Colocynthis, Sambucus, Pepo, Amygdala Dulcis, Amygdala Amara, Berberis Aquifolium, Asafetida, Myrrh, Gentian, Rheum, Frangula, Anise, Black Mustard Hulls, Cannabis Indica, Cardamom (seeds hulled), Syr. Trifolii Co. (Powder), Arnicæ Flores, Chirata, Staphisagria, Cocculus, Zea (corn silk), Juniper, Coffee, Pix Burgundica, Confectio Rosæ, Rubus Idæus, Lactucarium, Juglans, Mylabris, Rhus Glabra, Hæmatoxylon, Chicory, Stramonii Semen, Tea, Cochineal (black), Cochineal (gray).

I. CONTAINING NUMEROUS VEGETABLE FRAGMENTS.

A. CONTAINING STARCH.

a. CONTAINING CRYSTALS OF CALCIUM OXALATE.

α. *Crystals rosette or star-shaped.*

503. *Canella Alba.*—See No. 244.

504. *Frangula.*—See No. 274.

505. *Juglans.*—See No. 251.

506. *Rheum.*—See No. 215.

507. *Syr. Trifolii Comp. (Powder.)*—See No. 263.

β. *Crystals cubical, tetragonal, prismatic or more or less coffin-shaped.*

508. *Berberis Aquifolium.*—Crystals cubical (4 x 4 μ); starch in single

(2 x 2 to 5 x 7 μ) and 2 to 3-compound grains; libriform fibres 30 μ wide; all tissues light yellow and very hard and resistant.

509. *Cardamom.*—See No. 23.

510. *Frangula.*—See No. 274.

511. *Iris Florentina.*—Crystals either like in quillaja very long and 10–20 μ wide, or long needles; starch characteristic (15 x 30 to 15 x 15 μ); parenchyma; no cork; fibrovascular tissue.

512. *Juniperus.*—Crystals hexagonal (30 x 30 μ) in stone cells which are 60 x 60 and walls 15 μ thick; small amount of starch (5–7 μ); oil secretion reservoirs; brown pigment cells.

513. *Myristica.*—Crystals are of myristic acid. See No. 496.

514. *Quillaja.*—See No. 284.

515. *Syr. Trifolii Comp. (Powder.)*—See No. 263.

516. *Viburnum Opulus.*—See No. 287.

γ. *Crystals acicular.*

517. *Cocculus.*—Crystals are soluble in alcohol and not in dilute acids. See No. 547.

518. *Iris Florentina.*—See No. 511.

519. *Sarsaparilla.*—See No. 40.

δ. *Crystals as fine sand ("crystal sand").*

520. *Dulcamara.*—Numerous starch grains (7 μ); ducts reticulated 55 μ wide or with bordered pores (35–45 μ) associated with libriform cells 4 μ thick; cork; all elements gray or yellowish-gray color.

b. CONTAINING STARCH BUT NO CALCIUM OXALATE CRYSTALS.

521. *Chenopodium.*—See No. 108.

522. *Corn Bran.*—Less parenchyma, containing characteristic grains of corn starch, but more fragments of coat (bran); oil globules.

523. *Grits.*—More or less altered and unaltered starch grains; almost free from coat (bran); oil.

524. *Mezereum.*—Starch in single grains (7–10 μ), or in masses; numerous very long colorless bast fibres about 15 μ wide; light parenchyma; yellowish-brown or pinkish cork.

525. *Myristica.*—See No. 496.

526. *Orris Root.*—Starch of varying but rather characteristic shape (15 x 15 to 15 x 30 μ); may find tetragonal (20 μ wide), or acicular crystals; fibro-vascular bundles; no cork.

527. *Pepo.*—Few starch grains (2 x 2 to 3 x 4 μ) occur in outer epidermis and endosperm; characteristic pear-shaped, thick-walled (possessing simple pores) cells about 70 x 45 μ; yellow pigment cells of seed coat; oil and protein in embryo.

528. *Sago (True).*—Slowly affected by cold water when there separate the characteristic elliptical, or truncate elliptical starch grains (15–20 μ).

529. *Sago* (*Imitation*).—Breaks down quickly in water and shows characteristic *corn starch* grains.

530. *Strophanthus*.—Starch grains (4 μ), characteristic long non-secreting hairs (10 to 15 μ wide); narrow, almost colorless, collapsed cells and parenchyma containing starch, oil and aleuron; with H_2SO_4 should become green, indicating fresh and unimpaired strophanthus.

B. WITH LITTLE OR NO STARCH.

a. ANIMAL TISSUES.

On burning fragment on platinum foil gives off odor of burning animal tissue.

α. *Does not color glycerin.*

531. *Cantharis.*—Green metallic particles; not hairy.

532. *Mylabris.*—Very hairy.

β. *Gives a carmine-red color to glycerin.*

533. *Cochineal.*

b. WITHOUT STARCH, BUT CONTAINING VEGETABLE TISSUES.

α. *With Secreting Hairs.*

534. *Anisum.*—See No. 8.

535. *Arnicæ Flores.*—See No. 373.

536. *Cannabis Indica.*—Characteristic cystoliths, with or without broad base attached, in latter $CaCO_3$ in a granular mass. Entire cystolith about 200 μ long; oil secretion hairs; rosette-shaped calcium oxalate crystals (20 μ); characteristic cells of pericarp.

537. *Humulus.*—Characteristic secreting hairs (Lupulin); numerous rosette-shaped calcium oxalate crystals (8 μ); non-secreting hairs; characteristic epidermis; ducts yellowish.

538. *Rhus Glabra.*—Hairs may be numerous, long, broken, 1–celled or spatulate (consisting of a chain of cells), containing a red pigment dissolved; pigment cells; characteristic stone cells of pericarp (20 μ in diameter and wall 4–10 μ thick); oil and protein.

539. *Rubus Idæus.*—Characteristic long, more or less curved, 1-celled hairs (7 μ diameter), containing a reddish pigment; loose parenchyma, containing pigment and rosette-shaped crystals of calcium oxalate (7 μ); also characteristic hairs of receptacle and calyx.

540. *Strophanthus.*—Starch grains might be overlooked as it occurs in small grains and in small amount. See No. 530.

541. *Tea.*—Characteristic stone cells (idioblasts); numerous long, non-secreting hairs (10 μ wide); rosette-shaped crystals of calcium oxalate (10 μ); characteristic stomata (28 x 28 to 30 x 35 μ), with 4 or 5 "Nebenzellen"; adulterants are distinguished by possessing chiefly other forms of calcium oxalate crystals and hairs. (See also Mœller,)

3. *Sclerenchyma cells* (*i. e. stone cells*).

542. *Amygdala Amara* and } Characteristic lignified yellow epidermal
543. *Amygdala Dulcis.* } cells (70 x 65 μ), the walls of which are 4 μ thick and possess simple pores; endosperm layer 15 x 15 μ; crystals may be rosette-shaped or cubical about 7 x 7 μ, and occur near the ducts; or there may be acicular crystals, 40 μ long. Bitter almond distinguished by putting a few fragments in cold water for some hours, when odor of HCN develops; or take solution and add $(NH_4)_2S$, evaporate in a porcelain dish nearly to dryness, and add Fe_2Cl_6 = a deep blood-red color.

544. *Black Mustard Hulls.*—Consist chiefly of characteristic fragments of seed coat.

545. *Cocoa.* — Consist chiefly of protein grains and oil; starch grains 4–8 μ; fragments with brownish contents (cocoa red); fat crystals in little prisms or needles; few fragments of seed coat, consisting of hexagonal epidermal cells, a peculiar mucilage layer of small tabular cells and a layer of nearly isodiametric stone cells (10 by 10 μ), whose walls are 4 μ thick.

546. *Cocoa Shells.*—Chiefly fragments of seed coat. See No. 545.

547. *Cocculus.*—Characteristic reddish-brown pericarp with elongated stone cells of varying shape, but walls about 7 μ thick: crystals either needle-shaped (single or in groups about 35 μ long) or prismatic (10 x 100 long), soluble in alcohol, but not in acids.

548. *Coffee.*—Characteristic fragments of seed coat, consisting of altered parenchyma and spindle-shaped stone cells (35 μ wide and 175–200 μ long); most cells are those of endosperm, with thick (10 μ) porous brownish colored walls, and contents are oil, aleuron and starch. In commerce coffee is either generally "straight" or artificial. Latter consists of cereals, chicory, etc.

549. *Colocynthis.*—Stone cells of fruit, 70 x 50 μ, the walls of which are 15 μ thick; characteristic, nearly isodiametric, thick-walled stone cells, with but small lumen; the cells of embryo contain oil and aleuron. The amount of seed in powder is determined by number of oil globules and fragments of seed coat. The United States Pharmacopœia directs only pulp, not seeds or epicarp.

550. *Cydonium.*—Without starch or calcium oxalate; characteristic seed coat consists of an outer layer of clear mucilage cells, as in linum; beneath these are cells with thick walls, and containing a pigment reacting like tannin; parenchyma contains oil, protein and tannin.

551. *Linum.*—Numerous fragments, possessing characteristic tabular reddish-brown pigment cells; when seen in surface view (15 x 30 μ) associated with small yellowish-colored stone cells; mucilage layer prominent, being the outer epidermis; relatively thin-walled parenchyma, containing oil and aleuron.

552. *Pepo.*—See No. 527.

553. *Sinapis Alba* and 554. *Sinapis Nigra.*—No starch, tannin or crystallizable carbohydrate; mucilage layer not so prominent as in cydonium or linum; much oil and aleuron (latter in small grains); not infrequently find complete transverse sections of seed coat in the powder. In Sinapis alba the coat consists of hexagonal epidermal cells (45 μ); then follows a sub-epidermal collenchyma, a light yellowish or colorless pigment layer and a layer of stone cells (8 x 10 μ), the walls of which are 4 μ thick. In Sinipis nigra the unequal hexagonal epidermal cells are larger, 45–70 μ, the pigment layer is reddish-brown, and stone cells are about as in Sinapis alba. Both mustards are turned blood-red in color by H_2SO_4. Likely to find fragments of turmeric in yellow mustard.

555. *Staphisagria.*—Characteristic fragments of seed coat with brown pigment and possessing prominent hexagonal stone cells (80 μ wide) with thick walls (20 μ); long spindle-shaped cells, such as occur in delphinium, are present; parenchyma contains oil and aleuron.

556. *Stramonii Semen.*—Peculiar greenish fluorescence of mount in glycerin or glycerin + chloral. Nothing behaves like this. Characteristic seed coat, with yellowish and brownish thick-walled stone cells; most characteristic are the groups (train-like) of brownish stone cells, whose walls are very thick, with sometimes scarcely any lumen; parenchyma contains oil and aleuron, but *no* starch.

γ. *Sclerenchyma fibres.*

557. *Berberis Aquifolium.*—Ducts (50 μ wide), with bordered pores, wood fibres (20 μ wide; walls 8 μ thick) and medullary rays (9 rows wide, containing starch grains 10 μ) are yellow: bast fibres 15 μ wide and walls 4 μ thick; cork prominent; parenchyma of cortex contains brownish-colored substance.

558. *Chicory.*—Inulin masses; characteristic cork; numerous fragments of ducts of varying size; parenchyma (25 x 140 μ); laticiferous vessels 7–20 μ wide.

559. *Chirata.*—No starch; pollen grains (4 x 10 to 7 x 10 μ): parenchyma large. with simple pores; spiral and scalariform ducts (30 μ wide); numerous sclerenchyma fibres (20 μ wide and walls 4 μ thick); yellowish epidermis with brownish-colored collenchyma beneath; seeds reticulate and in shape like hyoscyamus; mycelial-like development containing dark-brown-colored substance.

560. *Hæmatoxylon.*—Cubical crystals (20 μ) in crystal fibres associated with yellowish libriform fibres (15 μ wide and walls 4 μ thick); large

ducts (140 μ wide) containing brownish masses; medullary rays are 4–5 cells wide; characteristic violet or purple coloration with alkalies; oil globules, resin and tannin masses.

561. *Matricaria.*—Numerous nearly spherical pollen grains (18–25 μ); fragments of corolla with secretion hairs: cells of anther; stigma with papillæ; peculiar ladder-like cells of walls of akene; sclerenchyma fibres of involucral scales.

562. *Pine Shavings.*—Characteristic tracheids with bordered pores.

563. *Taraxacum.*—Characteristic laticiferous vessels and inulin. See No. 165.

564. *Triticum.*—Without starch or calcium oxalate crystals; parenchyma containing irregular masses, soluble in water (sugar); yellow hypodermal cells with lignified thickening (walls 10 μ or more thick) and simple pores; three kinds of characteristic sclerenchyma of varying length and width; some of the fibres are marked here and there, apparently at regular intervals, with a tabular cell of same composition as fibre; ducts spiral and ring (30–50 μ in diameter).

δ. *Sclerenchyma cells or fibres wanting.*

565. *Aurantii Amari Cortex.*—See No. 206.

566. *Aurantii Dulcis Cortex.*—See No. 207.

567. *Gentian.*—See No. 467.

568. *Limonis Cortex.*—See No. 208.

569. *Sambucus.*—Numerous smooth pollen grains (18 x 18 μ); cells of anther; sometimes find small crystals of calcium oxalate in calyx; fragments of corolla with characteristic slight, dentate papillæ; in flower stalk are large spiral ducts (30 μ diameter); also parenchyma, with brown contents and collenchyma.

570. *Sassafras Medulla.*—Consists only of parenchyma cells, whose walls consist of cellulose and mucilage, and hence swell perceptibly in water. Mount sticky, mucilaginous.

571. *Taraxacum.*—Characteristic (not lignified) "Ersatzfasern," laticiferous vessels and inulin. See No. 165.

572. *Zea.*—Style with spiral and annular ducts, and from the epidermis there arise secretion hairs which are 300 μ long.

II. CONTAINING FEW FRAGMENTS OF TISSUES.

A. POSSESSING OIL.

573. *Asafetida.*—In a glycerin mount the powder shows irregular grayish (or gray streaked with brown) masses; opaque and becoming milky-white on edge from oil. The stony asafetida is pulverulent and contains less oil.

574. *Myrrh.*—In glycerin mount powder appears in yellowish or yellowish-brown irregular fragments made up of a grayish matrix and containing yellowish or yellowish-brown oil globules.

B. NO OIL, AND GLYCERIN MOUNTS NEARLY TRANSPARENT.

575. *Manna.*—Collection of long, transparent tetragonal or prismatic crystals of varying length and about 4 to 10 μ wide; fragments in glycerin leave clear crystals of mannite and little amorphous opaque residue.

576. *Pix Burgundica.*—More pulverulent (M. P. lower) than Terebinthina: lemon-yellow, transparent, or grayish, somewhat translucent, more or less rounded and opaque masses. Soluble in glacial acetic acid, giving a yellowish-brown solution.

577. *Sugar.*—Like rock candy, dissolves in glycerin without residue.

578. *Terebinthina.*—More adhesive (soft in summer) than Pix Burgundica; nearly transparent colorless or light yellowish masses of irregular rounded outline. Solution in glacial acetic acid of a light yellow.

C. NO OIL, AND MOUNTS IN GLYCERIN MORE OR LESS OPAQUE.

579. *Confectio Rosæ.*—Fragments of red rose petals with characteristic more or less rounded papillæ; few elliptical pollen grains (18 x 32 μ); mass grayish and made up of rounded grains; some transparent sugar crystals.

580. *Lactucarium.* Grayish brown and dark brown, irregular and rather angular masses; with alkalies they become reddish-brown and then a dirty brown; with H_2SO_4, but slightly (faint yellow) affected.

GROUP NO. 7. VEGETABLE (ALSO ANIMAL) DRUGS WHICH DO NOT OCCUR IN POWDERS, BUT IN MASSES OR LIQUORS.

I. LIQUIDS.

581. *Balsam Peru.*—Color blackish.
582. *Copaiba.*—Color amber.
583. *Gurjun Balsam.*—Color amber.
584. *Mel.*—Colorless or faint yellow.
585. *Styrax*—Peculiar gray color.

II. SEMI-FLUID OR NEARLY SOLID.

586. *Balsam Tolu.*—Characteristic odor.
587. *Prunus.*—Characteristic tissues of pericarp and seed.
588. *Tamarindus.*—Charactertistic tissues of pericap and seed.

III. SOLID.

589. *Elastica.*—Not pulverulent.
590. *Resina Podophylli.*

REMARKS.

This investigation, which has occupied the attention of the author for several years, is based on the careful study of the crude (sometimes also fresh) drug, as well as authentic commercial powders (some of these have been furnished by Gilpin, Langdon & Co.), and in many instances drugs ground by the author.

In publishing these results at this time, no one realizes more than the author that the whole scheme is but tentative, and that additional study, and the application of the method outlined, will, no doubt, cause some changes to be made in practice. It would be surprising, furthermore, if there are not some errors of either commission or omission, in that in some cases the characteristics given or withheld may be due to the examination of diseased, deteriorated and even spurious drugs. But all this is due to the fact that the collecting and caring for drugs is not carried out on scientific principles. Even should there be oversights or errors, the publication of the work must be of some value to pharmacognosists. We must realize that a communication of this kind, to be complete in any sense, must have incorporated with it the results and experiences of numerous investigators from rather widely scattered sections of the country and world.

The scheme is based on scientific principles, but it has been considered desirable at the outset to open up the subject by dividing the powders into groups depending on their color. It is true that color varies in the plant itself in nature, and according to the time of gathering, mode of collecting and subsequent treatment, exposure to light, etc. But it is very necessary that these things be thoroughly studied before we are prepared economically to properly exhaust drugs, make preparations and pronounce on the therapeutic value of them. In this connection, it must be stated that in the study of powdered drugs the education of the eye to color is very important, and, indeed, necessary. Old and freshly-powdered drugs are to be distinguished by this means alone, as also a properly prepared drug from one carelessly treated. To the author's mind the eye and nose (possibly the taste) are very important factors in the study of powdered drugs in connection with the microscope.

A number of interesting features have been brought out in this investigation. In fact, it opens up possibly an entirely new method in the study of our drugs at large.

(1) In the first place, in the color of the powder certain characteristic and diagnostic features are brought to light. Leaf and herb drugs in the powdered condition should be greenish or grayish, and not blackish or brownish-black; many roots and rhizomes ought to be a light tan rather than a dark brown, etc. The value of Taraxacum and other more or less important drugs rich in reserve materials, as inulin, starch, etc., may be ascertained, as these reserve materials are contained, no doubt, in greatest

abundance in the plant at the time that the active medicinal agents are present in likewise greatest amount.

(2) Certain facts, as the presence of pollen grains in Chestnut leaves, will cause us to go into the woods and study the ecological and biological relations of the plants which yield us our drugs. For, without this study upon Nature herself, we shall never know what value to place upon such observations or their real significance.

(3) The presence of reserve starch in leaves and a diminution in calcium oxalate in any part of the plant where normally it is present, will cause us to open our doors to the study of micro-organisms and inquire as to what they have to do with the deterioration of drugs and the spoliation of medicinal preparations.

When these pharmacognostical problems are understood, then we will cease to devote our energies to indiscriminately mixing certain things together in our attempts to make elegant pharmaceutical preparations, but will start out to know what causes the difficulty ; and, knowing this, we know how to proceed intelligently and in a scientific manner, just as we proceed in certain chemical-pharmaceutical work in the making of these preparations.

(4) The use of the microscope in the examination of vegetable drugs (whether they be crude or powdered), as also in the examination of animal substances and chemical compounds, is an application of this instrument to a degree that this communication indicates—to some extent at least—the widest practical application. In fact, it opens up the necessity for making microscopical examinations and micro-chemical tests to a much greater degree than heretofore on the crude as well as powdered drug.

The author would impress again upon all investigators the necessity for accurate measurements of tissues and contents of materials which are studied ; as also the name of the media or reagent in which the specimen lies or has been subjected. KOH, choral, glycerin, etc.—all of these have the property of affecting the thickness and character of the cell walls and cell contents, and it is upon these characteristics that we must rely for our useful characteristic studies of crude and powdered drugs.

Upon motion of Mr. Sayre, seconded by Mr. Whelpley, the paper was received and ordered put in the usual course.

DR. RUSBY: I can not speak too highly of this paper. I think that this number of the Proceedings of the American Pharmaceutical Association is likely to be known for all time as the Botanical Number.

DR. WHELPLEY: If there is no objection, the special committee on the Unauthorized Publication of Papers will make a report at this time. As some are present who were not with us when this committee was appointed, it may be well to state that the chairman of the Section stated in his remarks that one or more papers had been printed that had not been approved by the officers of the Section. The committee, after investigation, desires to report as follows:

REPORT OF SPECIAL COMMITTEE ON UNAUTHORIZED PUBLICATION OF PAPERS.

In order to avoid the possibility of papers being printed by the Association printer before they have been passed upon by the officers of the Section to which they belong, we recommend that the General Secretary be requested to notify the official printer to return to the author any paper or papers not bearing the approval of the chairman of some Section of the Association.

We believe that this action will enforce the letter and spirit of the resolution proposed by the Scientific Section in 1887 and approved by the Association (see vol. 35, p. 626).

H. M. WHELPLEY,
W. C. ALPERS,
H. H. RUSBY,
Committee.

DR. WHELPLEY: I would like to add that nothing in the resolution or recommendation of this Committee obliges a member to have a paper printed, but those that are printed must have the stamp of the officer of the Section to which they belong before being brought here for distribution. A previous officer of the Section said that several papers of the Section under his administration had been distributed that he had not seen until they appeared at the meeting.

Mr. Alpers, seconded by Mr. Sayre, moved the adoption of the report. The motion prevailed.

MR. CASPARI: I was in part instrumental in having a resolution passed some years ago, at Denver in 1895, that all papers printed in advance of the meeting of the Association should first be approved by the officers of the Section to which they belonged. At that time considerable confusion had arisen, and that resolution was passed to cure the evil; I called the printer's attention to the fact at that time. I know he has received from me this year in particular no paper until the regulations were complied with. But once or twice it has happened that the Association printer did act under the impression that any member had a right to have his paper published without such authority; but he has long since received orders not to print any paper, no matter by whom presented, until approved by the Chairman of the Section. I had a special understanding with the printer again this year in regard to this matter.

THE CHAIRMAN: The next paper on our list is one by Mr. A. B. Stevens, on "Cathartic Acid in Rhubarb."

Mr. Stevens read the paper as follows:

CATHARTIC ACID IN RHUBARB.

BY A. B. STEVENS.

A vast amount of work has been done to determine the active constituents of rhubarb, but as yet little unity appears in the results.

In 1878, Prof. Dragendorff* reported the analyses of five varieties of rhubarb, cathartic acid appearing among the constituents given, the yield varying from 2.26 per cent. to 5.25 per cent. The author states that he considers the active principle upon which the purgative properties of rhubarb depend to be cathartic acid, a glucosidal, nitrogenous substance, possessing the closest resemblance to the active principle occurring in senna leaves and in black alder bark.

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* Pharmaceutische Zeitschrift fur Russland, Feb., 1878. See also Pharmaceutical Journal (3), 8, p. 826.

In 1879, H. G. Greenish * examined four specimens of rhubarb, reporting cathartic acid in three samples, but was uncertain as to its presence in the fourth sample, which was grown in the botanical garden at St. Petersburg. He reports 4.96 per cent. in Chinese rhubarb, which agrees very closely with the amount found by Prof. Dragendorff in the same variety (4.88).

In 1884, William Elborne † analyzed five specimens of English grown rhubarb. He reports that all contained cathartic acid, the amount varying from 3.2 to 4.5 per cent. Mr. Elborne also states that he considers the cathartic acid obtained from rhubarb to be identical with that found in senna.

With the exceptions of these three writers, cathartic acid is scarcely mentioned in connection with rhubarb, and American text-books entirely ignore its existence.

Dr. O. Hesse,‡ in an article upon the "Chemistry of Rhubarb," states that he considers the cathartic principle of rhubarb to be an amorphous brown resin, but he examined only the ethereal extract of rhubarb, which should not contain this purgative principle, as cathartic acid is insoluble in ether.

For a number of years I have been deeply interested in this subject. The following is a brief summary of the work done by students under my directions:

In 1887, Charles Baker worked upon the separation of the constituents of rhubarb for museum specimens. One of the substances separated was the cathartic acid of Dragendorff, a brownish-black amorphous powder. When dried upon glass plates it formed glossy black scales. The method used in the separation of the acid was based upon Dragendorff's method, which is as follows:

"Five grammes of rhubarb were macerated for two days with sufficient water to make the volume equal 100 Cc. Upon filtration the yield of extract was about 55 Cc. The marc was washed with water sufficient to bring the extract up to 100 Cc. The watery extract was mixed with three times its volume of 95 per cent. alcohol, and after 48 hours the precipitate was placed on a filter, washed with alcohol, the filtrate and washings were distilled in a partial vacuum until 25 Cc. remained. This was mixed with 200 Cc. of absolute alcohol, which precipitated the cathartic acid, which was washed with alcohol and dried."

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* Pharmaceutical Journal (3), 9, p. 933.

† Pharmaceutical Journal (3), 15, p. 137.

‡ Pharmaceutical Journal, 1895, p. 325. Also A. Ph. A. Proc., 44, p. 549.

In 1892, O. C. Pusch, following the same method, obtained 4.03 per cent. of cathartic acid from selected samples of rhubarb.

In 1895, J. H. Bowerfind, following the same method, separated cathartic acid from both rhubarb and senna. The products were identical in appearance and physiological action, 0.4 grammes producing a watery stool, accompanied by much griping, in about seven hours. The yield of acid from Chinese rhubarb was 3.92 per cent.

In 1896 George P. Wilder prepared a bibliography of cathartic acid from rhubarb and senna, and with the writer prepared cathartic acid from both by the following method:

1000 grammes each of rhubarb and senna were treated separately as follows: The drug was moistened with alcohol and allowed to macerate for 48 hours. It was then percolated with strong alcohol until exhausted, to remove chrysophanic acid, resins, etc. The marc, after exhaustion with strong alcohol, should contain the cathartic acid with mucilaginous substances, but none of those substances usually reported as the active constituents of rhubarb. To ascertain if it contained any active principle, a cold infusion of 6 grammes of the dried marc from rhubarb was taken by a healthy individual before retiring. This produced a copious watery stool, accompanied by much griping, in about seven hours. This convinced us that a cathartic principle still remained in rhubarb after exhausting with alcohol. The marc, after drying, was macerated with 60 per cent. alcohol, and then percolated until exhausted. The percolate was evaporated at a very gentle heat (about 50° C.) to a syrupy consistence, with constant stirring by motor power. This extract was precipitated with 85 per cent. alcohol, and filtered to remove gum. The filtrate was evaporated in like manner to a syrupy consistence and added, with constant stirring, to a large excess of absolute alcohol. A brown precipitate was thrown down, which was collected and spread on glass to dry. The resulting products were in black shining scales. 0.4 gramme doses of each were taken by adults, producing copious watery stools in from seven to eight hours. The cathartic acid obtained from rhubarb and senna were to all appearances identical in physiological and physical properties.

Cathartic acid is very easily decomposed by heat, and the evaporation of the watery extract by Dragendorff's method is very tedious. This difficulty is somewhat overcome by the second method, which requires only the evaporation of an alcoholic solution.

The product from either of the above methods may not be free cathartic acid; the acid may be in combination. The object in following either of the above methods is to obtain the acid in its natural combination without decomposition.

Dr. Stockman* separated the acid from senna by the use of various precipitants, as salts of lead, copper, calcium, sodium and barium, obtaining the best results with barium.

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* Pharmaceutical Journal (3), 15, p. 749.

During the past year, assisted by E. D. Benjamin, I have succeeded in the separation of a larger quantity of the acid for future investigation. The method used was a modification of the former method. The evaporation was performed without direct heat by passing a current of air, warmed and dried, over the surface of the liquid, which was constantly agitated with a mechanical stirrer. The final precipitate of cathartic acid was dissolved in a small quantity of water and reprecipitated with strong alcohol. This operation was repeated several times. Lastly, the precipitate was spread upon plates of glass to dry. The product was similar in appearance and physiological action to that already reported.

The work will be resumed by the writer during the coming year, when I hope to make ultimate analyses to establish its formula and compare it with the formula of cathartic acid from senna. I have followed in the footsteps of others when calling the above substance cathartic acid. Future developments may necessitate a change of name, but I believe that rhubarb contains a cathartic principle, soluble in water, that is identical with the so-called cathartic acid of senna.

Chemical Laboratory, University of Michigan, August 10, 1898.

Mr. Mayo moved to accept the paper and have it take the usual course, which motion was duly seconded and carried.

THE CHAIRMAN: Before we proceed with the discussion of this paper I suggest that we listen to some preliminary remarks by Mr. Alfred Dohme, on "The Bitter Principle of Cascara Sagrada," a subject which he has under investigation at the present time in conjunction with Mr. Engelhardt.

Mr. Dohme then read the following paper:

THE BITTER PRINCIPLE OF CASCARA SAGRADA.

BY ALFRED R. L. DOHME AND HERMANN ENGELHARDT.

As pointed out in our paper presented to this Association at its last meeting at Lake Minnetonka, and entitled, "The Chemistry of Cascara Sagrada," the active principle of this drug, purshianin, is odorless and tasteless. In that paper we also expressed our intention of undertaking the isolation and study of the bitter principle of the drug as well as the changes which the same undergoes when treated with magnesia, whereby the drug is rendered free from bitterness. The phenomenon was well known at the time, but the explanation of the same was wanting. Unfortunately we have not had the necessary time to complete this investigation, and can only at present writing state the preliminary steps of the work whereby we hope ultimately to solve the problem. We began the work by evaporating the fluid extract until all the alcohol was removed, whereupon a resin was precipitated which was not, however, the bitter principle, and was not hence examined more closely. The filtrate from this was treated with calcined magnesia, care being taken to use a freshly calcined article, for in proportion to the amount of carbonate and basic carbonate present is the removal of the bitter principle less complete. The result of this was the precipitation of a dark brown pulverulent substance, which was filtered off and dried. It was then treated with alcohol, which turned it reddish brown and dissolved it all with the exception of a wax-like residue. The alcoholic solution was evaporated and the residue treated with diluted sulphuric acid, whereupon the greater part remained undissolved and the acid liquid resulting yielded to ether a light-brown colored resin. This undissolved portion is in our estimation the bitter principle, for it possesses an extremely bitter taste of marked and increasing intensity. We believe that the magnesia merely unites with this bitter principle present in the bark and its preparations as an acid resin, and forms the magnesium salt of the latter, which being insoluble is precipitated. When this salt is treated with dilute acids, as we did, the magnesium unites with the acid to form its magnesium salt and the resin is precipitated. In case of making preparations of this drug that are free from bitterness, when the magnesia is mixed with the ground bark the action of the fluid menstruum added is precisely the same as in the solution as above described. Only in this case the insoluble magnesium salt of the bitter principle remains with the dregs while the menstruum extracts all the active principle. We have saponified the bitter principle which when separated and recrystallized separates from all solvents tried as a syrupy, dark reddish-brown residue. We could not obtain it in crystals as yet, but we could bear witness to its pronounced bitter taste, which grows more intense the longer it remains in the mouth and the farther back in the mouth it gets. The result of the saponification was two substances, neither of which has however yet been obtained in pure form. We propose to continue and complete the work and determine if possible what all the four substances we have described are. As already stated, this paper is only a preliminary statement, intended mainly to reserve the field of work for ourselves until it is completed.

Baltimore, August 26, 1898.

Mr. Sayre read a paper on "The Alkaloidal Constituents of Taraxacum."

ALKALOIDAL CONSTITUENTS OF TARAXACUM.

In former papers presented to this Section relating to the important constituents of taraxacum root, reference has been made to the evidence for the existence of an alkaloid, as disclosed by a preliminary analysis. The work of the past year has been devoted to this phase of the subject. It may be remembered by those who have followed this investigation that 40 pounds of the root were percolated with chloroform, and the dregs from this was extracted with alcohol. The *taraxacerin* was separated from the chloroformic extract, and a report of its ultimate analysis was made at the last meeting of this Association. The examination of the chloroformic and alcoholic extractives was carried beyond the point of last year's report, but as the work was not then completed it was stated that this further examination would be made the subject of a paper at this meeting.

During the past year more time has been devoted to this chloroformic percolate, and in order that trustworthy results be assured, a fresh lot of taraxacum root was collected, dried and ground by myself. Several lots of 50 grammes each were exhausted with chloroform, and the percolates treated in various ways. It is needless to go into detail at this point. Suffice it to say that by the usual methods of procedure characteristic alkaloidal reactions were obtained, thus repeating the experience referred to in former papers.

It was found that if the drug be first percolated with petroleum ether, then with ether, and finally with chloroform, a solution was obtained in the last mentioned solvent, that, on evaporation, yielded an impure crystalline substance which, when washed with alcohol, redissolved in chloroform, and the latter evaporated spontaneously, deposited well-defined white acicular forms. These crystals are here exhibited. They are insoluble in water, acidulated water, alcohol and ether, but are very soluble in chloroform. In the saliva they dissolve very slowly, producing an acrid sensation. Further characteristics of these crystals have not been determined, therefore only a passing mention is now made of them, hoping to make a fuller report of them later.

Alkaloid of Taraxacum. It is very evident that the alkaloid of taraxacum exists in the root in very small quantity. Accordingly, a large amount of the drug is necessary for its isolation and study. Through the kindness of Prof. J. U. Lloyd I have been able to secure a sufficient amount. Thirty pounds of the drug were carefully collected and prepared under his personal supervision. He says "The mill was thoroughly cleansed under my care, and I stood over it while the root was ground. It was allowed to run into a new paper sack, and it was then packed into an absolutely clean percolator, sealed, and percolated with pure chloroform. . . . There was no chance for any foreign contamination of the drug."

METHOD OF ISOLATING THE ALKALOID FROM THE CHLOROFORMIC EXTRACT OF TARAXACUM ROOT.

Thirty pounds of the root yielded ten ounces of a dark green chloroformic extract. The alkaloid contained therein was determined by assay in the following manner:

5 Cc. of the extract were added to 10 Cc. of chloroform contained in a separatory funnel, and the fluid was then shaken out with about 30 Cc. of water acidulated with sulphuric acid. After this the chloroformic solution was drawn off into a flask and the acidulated aqueous liquid in the funnel

shaken out again with five successive portions of chloroform. In each case there were 10 Cc., so that the last traces of wax, chlorophyll, etc., might be removed from the acid liquid. The united chloroformic solutions were then placed in a separating funnel and again shaken out with four successive portions of about 10 Cc. of acidulated water. This was done in order that any trace of alkaloid should be removed.

This acidulated solution was again freed from waxy and fatty matter by shaking out with five successive portions 10 Cc. each of chloroform. The second acid solution was then united with the first, these containing the bulk of the alkaloid. The liquid was rendered alkaline with solution of ammonia and the alkaloid shaken out with three successive portions, 10, 10, and 15 Cc. of chloroform. The solutions were placed in a beaker of known weight and evaporated to dryness on a water bath. When dry, a little sulphuric ether was added, and this was evaporated in order to expel the last traces of chloroform. The alkaloidal residue was then weighed, yielding 0.0052 grammes, corresponding to about .002 per cent. The residue when dissolved in dilute sulphuric acid gave heavy precipitates with Mayer's solution and with solution of iodine in iodide of potassium.

It is to be hoped that during the next year I shall have time and opportunity to separate enough of the pure alkaloid to make a combustion and determine its composition. I would suggest as an appropriate name for the principle, *Taraxine*.

Mr. Remington, duly seconded, moved that the paper take the usual course, and the motion was carried.

Mr. Lloyd: I have heard the reading of this paper with much pleasure, and I hope the Professor will continue his work and make a combustion of the alkaloidal substance. In connection with the Taraxacum used, I will say that it was gathered on my own farm, under my own direction, by a professional herb-digger, and passed through my hands; was ground in a mill under my supervision, and I know that it was all right

The next paper read was one by Mr. E. H. Gane on "Gogo," a new drug from the Philippines.

NOTE ON "GOGO," A PHILIPPINE ISLAND DRUG.

BY E. H. GANE, PH. C.

Some time ago I received from a New York shipping merchant a package containing a fibrous vegetable drug, labelled "Gogo Root," with an inquiry as to its medicinal and market value. Not being familiar with the drug, I made inquiries as to its origin, and was informed that it came from the Philippine Islands, and had been presented to the merchant by a ship's captain, with the recommendation that it was an infallible remedy for dandruff of the scalp, and for skin diseases.

The "gogo root," so-called, was in long flattened pieces, three to four feet in length, and two to four inches wide, of a brick-red color, of very fibrous nature, interspersed with long, tough, woody strings. A brief examination soon showed the term root to be a misnomer, as the material was evidently of stem origin. Microscopical examination of the long, woody strings showed these to consist of the wood vessels, some of which were of enormous size and length. The size of these vessels is, indeed, one of the characteristics of the plant.

But little literature on the drug could be found, and none on the constituents of the plant. The only publication mentioning it under its native name is "Dalzell & Gibson's Bombay Flora, Part I, page 84, where it is noted that "gogo" is the native name for the fibrous portion of the trunk of Entada Scandens (Benth.), N. O. Leguminosæ. The plant from which "gogo" is derived is described in Dymock & Warden's "Pharmacographia Indica" as a gigantic climbing shrub, chiefly noted for the size of its legumes, which are several feet long. The seeds are of a large size, heart-shaped, flattened, and about two inches in diameter, and contain 7 per cent. of a neutral, turbid, pale yellow, viscid oil, with traces of saponin (Moss, Pharm. Journal, Vol. XVIII., 1887). The seeds have been found admixed with Calabar beans, from which, however, they can readily be distinguished (Day, Western Druggist, March, 1898). They are reputed to possess emetic properties, but, according to various authorities, are roasted and eaten in the Islands of Java, Sumatra and the Philippines.

The plant, also, has the reputation of possessing emetic properties. "Horsfield says that this plant is used as an emetic in the island of Java, but he does not state what part is employed. Ainslie notices it under its Javanese name of Gandoo, and remarks that it is the Mahapus-woela of the Cingalese, and the Faba Marina of Rumphius. The Lepchas and other hill tribes use the seeds as a soap to wash their hair, and as a food after they have been roasted and soaked in water." (Dymock & Warden.)

A letter addressed to Prof. Dean C. Worcester, of the University of Michigan, who has traveled extensively in the East, brought the following reply:

"The sample you send seems to be 'Gogo,' but you are quite right in thinking it not a root. Gogo grew abundantly in Mindoro, as well as other islands which I visited. It is obtained by scraping the bark from the stem of one of the forest-creepers, and pounding what remains. I am not enough of a botanist to give you any assistance in identifying the plant from which it is obtained.

"Although I have seen it in use times enough, and have had it pointed out by my men in the jungle, I never gave it any special attention, and can add nothing to what you already know as to the uses to which it is put by the natives. They wash their hair with it, likewise their bodies. More than this I do not know."

Dalzell & Gibson say that an infusion of the spongy fibres is used with advantage for various affections of the skin in the Philippines.

The drug itself possesses an acrid, burning taste when chewed, and when swallowed causes considerable nausea, which would probably lead to active emesis if enough of the powder were taken.

A detailed examination of the drug was carried out, the fibrous material being reduced to powder and extracted with the usual solvents. The residues, after evaporation of the solvent, were then examined with a view to determining the active ingredient.

The extractive matter removed by petroleum spirit and ether was extremely small, considerably less than one per cent., and examination showed it to contain nothing of interest.

Alcohol extracted about one per cent. of solid matter, which consisted of resinous and coloring substances and a little saponin. No alkaloidal or glucosidal substance was detected.

As the drug evidently contained considerable amounts of saponin, an attempt was made to determine this constituent quantitatively, as the preliminary examination showed this, in all probability, to be the active ingredient. The process adopted was that of Procter, which consists in exhausting with dilute alcohol (60 per cent.), concentrating the extract and washing with ether to remove fixed oil, &c. The extract is then precipitated by a mixture of alcohol 3 parts, and ether 1 part. The crude saponin which falls is then purified by solution in water and reprecipitation. By this method the drug was found to yield 0.56 per cent. of saponin. This substance readily hydrolyzed under the action of dilute acids, and appeared identical with the saponin obtained from Quillaia bark. Nothing further of any interest could be obtained from this drug.

The active ingredient appears to be saponin, which is doubtless responsible for the emetic and other effects claimed for this plant. The curative powers of the drug, in diseases of the skin, are probably not greater than those of ordinary soap and water, the lack of which is responsible for so many of these affections in Eastern climates.

Mr. Remington moved to accept the paper and let it take the usual course. Carried.

Mr. Hynson gave the Convention a talk upon "A Practical Plan for Differentiating Coal Tar Products," and gave a lot of interesting experiments in the reduction of sulfonal, phenacetin and acetanilid with burning alcohol, showing a residuum in each case characteristic of the drug.

At the conclusion of his remarks and experiments, it was moved that Mr. Hynson prepare a paper upon this subject for publication in the Proceedings; and, after considerable discussion as to the merits of the tests made, the motion was carried.

A PRACTICAL METHOD FOR THE DIFFERENTIATION OF COAL-TAR PRODUCTS.

HENRY P. HYNSON, PH. G.

Some simple, easily applied means by which the popular coal-tar products, used in medicine, can be identified and distinguished or separated from compounds with which they might be confused, seems quite desirable. I refer, of course, to such substances as acetanilid, phenacetine, sulfonal, trional, tetronal, etc. The busy pharmacist hurriedly scanning the journals or running the indices of standard text and reference books finds little, if anything, helpful. He may discover different degrees of solubility given and see varying melting points noted. But who can accurately apply these tests, who is willing to discriminate by them? The practiced operator, with delicate and ample apparatus at hand, may find them satisfactory; such work is, however, hardly possible with the active practicing pharmacist.

The physical characteristics of these products are such as to enable one to class them as synthetic organic compounds, with reasonable accuracy. But this ability to classify them only increases the difficulty of identifying individual members, because at once we are confronted with an insoluble organic substance, in most instances with negative qualities. Absolutely no literature bearing upon the subject is at hand, and our scientific friends, unfortunately, in this instance cannot help us. One may be called upon, as I was, by a prominent physician and profitable patron to report the contents of a five-grain gelatin capsule, which one of his patients had been taking before she came under his treatment, or be mildly accused by a less friendly practitioner of substituting sulfonal for trional. What would be your report in the one case and your defense in the other? It was in such a position I found myself, and in sheer desperation I sought means by which to put myself in a more creditable place. It occurred to me that, if I dampened the substance in question and several others possessing similar physical qualities with alcohol and ignited all at once, I might, by closely observing the flames, be able to discover a peculiarity of the flame of the unknown powder similar to that produced in some one of the others and peculiar to these two; I would then, I thought, have a clue. Several repetitions of the experiment brought disappointing negative results. The keen eyes of Mr. H. A. B. Dunning, my assistant, however, noticed that each substance had left its own peculiar residue and that the several residues of each substance were very unlike. I think, therefore, Mr. Dunning is the real discoverer of this phenomenon; certainly he deserves equal credit with myself for its application, if indeed it is found creditable. Subsequently, in such little moments as we could steal we experimented, becoming all the while more and more enthusiastic.

After Mr. Dunning had given up the spatula for the rifle and had bravely enlisted as one of our noble volunteers, I began to carefully experiment as to the best means to use whereby the results we desired could be obtained. After using various vessels, and solutions of different strengths, I am now satisfied that nothing is better for the purpose in the way of a vessel than a 60 Cc. porcelain evaporating dish. I had thought, after making several experiments, that individual butter-dishes would be exactly the vessel required. Experiments with these, however, proved them to be useless ; the receptacle must be deep, and should be evenly and regularly made, presenting, if possible, a perfectly formed concave. Perfection in these dishes cannot, it seems, be had ; were they more perfectly made I believe even more regular results than I will show might be obtained. It will be found by close observation that nearly every dish of this kind has an indentation in the bottom, resulting, no doubt, from standing the freshly formed clay on its bottom before it is "burned." This irregularity is of much moment in examining such products as I shall group in Class B ; in many cases preventing uniform results. I therefore beg the operator to select for experiments with these as perfectly formed dishes as are obtainable.

The strength of the alcoholic solution should be two per cent. When a substance is not soluble in alcohol to the extent of two per cent., a saturated solution should be made. If a powder is found, a portion of which is soluble in water, it is natural to conclude you are dealing with a mixture. In such a case you should wash with water, and make a two per cent. solution of the residue, or use sufficient of the mixture to make an alcoholic solution the desired strength. All solutions should be perfectly clear, filtered if necessary. It may be well to state that ethyl alcohol, pure and fully 95 per cent., should be selected. The use of methyl alcohol brought modified effects in many instances, strange as it may appear.

To get the results, then, to which I would call attention, and which I think remarkably interesting, it is only necessary to place 5 Cc. (the quantity of solution should invariably bear a relative proportion to the size of dish) of a two per cent. alcoholic solution of the substance under consideration in a 60 Cc. porcelain capsule, ignite the alcohol, and closely watch the burning fluid, observing the changes going on as well as the residue remaining. Attention to the behavior of the residue should be given until it finally subsides and presents a permanent picture. Conclusions, I repeat, should be based upon the peculiarities developed during the burning of the alcohol, as well as upon the behavior of the residue and its final appearance.

I believe every one here will be surprised to learn that the burning of 5 Cc. of an alcoholic solution of acetanilid gives practically the same result, no matter how many times repeated, but greater, I think, will be the surprise when I prove that each substance gives its own peculiar and characteristic result—in almost every instance so marked and distinct that after having been classed by ordinary physical means, its identity can be accurately ascertained. One needs to make but a few tests to become fairly familiar with each reaction. Yet even this is not necessary, since plates from standard substances can be prepared, if need be, for each operation, or first one substance and then another can be tried until similar results are secured.

My method is, of course, for simples ; the plan cannot, I think, be used for mixtures, unless the mixture is made after a fixed formula, and thereby becomes a standard with the possibility of having a fixed specimen with which the mixture in question can be compared. By this I mean to convey the idea that such mixtures as antikamnia, ammonol and sedapyrine can be as easily identified as can acetanilid, phenacetine, or sulfonal. But I do not pretend to say that antikamnia could be discovered if mixed with unknown quantities of quinine and morphia, nor could phenacetine be found and fully identified if a constituent of a mixture of unusual proportions unless, as an insoluble substance, it can be separated. Although I believe, as I have already stated, that satisfactory conclusions may be arrived at with no more than solutions of standards with which to make plates for comparison, it will be helpful, perhaps, to make classifications and give descriptions which, in many instances, will enable the operator to make a preliminary examination ot such accuracy as will need only the confirmation of actual comparison. In trying to make the application of this method broad and useful, I have investigated compounds not strictly aniline derivatives, but of such a nature as to make an association possible. With the same object in view, but without the intention of including my observations of these in this paper, I have made trials with the principal alkaloids, obtaining therefrom interesting data.

Derivatives, mixtures and compounds so far examined by me, may be conveniently arranged, with respect to the character of the residue of each into three general classes.

Class A includes those leaving well defined and characteristic rings—rings which adhere to the sides of the dishes during the burning or harden immediately upon its cessation.

Class B includes those which form, while burning, smooth liquid rings of varying shades, and which, upon the destruction of the alcohol, run in and form melted masses, upon the behavior of which and their final appearance, largely depends identification.

Class C includes a few compounds of a volatile nature which sublime upon the sides of the dish or leave a liquid non-solidifying residue in its bottom. These will not be considered in detail.

Members of Class A: Phenacetine, Sulfonal, Salophen, Lycetol, Chloralose, Chloralamid, Sedapyrine, are so easily separated by their residues from Classes B and C as to make the formation of this group easy of accomplishment. The individuals may be distinguished by the following specific characters:

Phenacetine early shows a deposit of the salt on the sides of the dish. This first deposit, afterwards, darkens and shows black spots. Soon a white liquid ring with incrusted inner edge forms, this gradually grows darker until it reaches a yellowish-brown, and finally, upon the destruction of the alcohol, becomes a "frying," peculiarly irregular ring which subsides into a circle of friable brown nodules. This residue is something, but very little, like the sulfonal residue; the color is darker and the surface rougher, there is also an absence of the white, well-defined crystal line deposit within the ring, which latter, reminds one of a badly formed or broken "Pharaoh's serpent."

Sulfonal shows, first, incrustation on sides of dish above liquid, which soon disappears and is followed by a white liquid ring which grows smaller slowly. Upon the consumption of the alcohol this liquid ring is changed into an irregularly formed circle of crystalline matter, presenting edges sharp and well-defined, generally white or nearly so. The space within the ring is covered with a crystalline deposit. In the case of phenacetine, the deposit is not well formed. The rings of both sulfonal and phenacetine are prominently raised from the surface of the dish, but the residue of the latter does not present the undulated sharp-pointed appearance of sulfonal. "Like a ring-worm" would probably describe sulfonal's deposit.

Salophen: The alcoholic solution of this substance when ignited soon deposits the salt, forming a white dry ring adhering to the sides. Deposited salt and outer edge of ring become dark, the latter from centre of band grows lighter and quickly dries. The inner edge is of bright crystals like mica. The alcohol extinguishes quite rapidly. The residue is peculiarly characteristic. Central space perfectly clean.

Lycetol almost immediately begins to deposit a succession of brown rings from without inward, gradually closing in upon the interspace and ending in the formation of a brown band with a slightly lighter colored inner edge, and entirely without the raised or embossed effect of phenacetine or sulfonal.

Chloralose: The solution of this burns steadily and quietly, leaving a narrow, well formed ring with the outer edge of a smooth light brown mass, inside of which is formed a fringe of white incrustations. This ring is very unlike any other, the two colors being distinct. Central space covered with white deposit.

Chloralamid solution burns quietly. Brown successive rings are found leaving a narrow brown band unlike any other produced, yet so slightly characteristic as to make description difficult. The closing moments of the procedure produce a "cracking" noise. Fumes of chloral are given off and a non-inflammable liquid remains in the centre.

Sedapyrine burns without incident for some moments, then the sides of dish become brown, and a dark brown ring forms at edge of fluid which at first was white. Inside of this, a yellowish white inner ring is left with crystals in centre. Near the end alcohol burns as if stimulated by oxidizing material and, after it is consumed, considerable smoke is given off. This residue is most decided and well marked.

Class B presents a group of easily classified members. The absence of the ring or circle separates these easily from Class A, and the presence of the solid mass prevents the confounding of them with members of Class C.

Class B includes acetanilid (antifebrin), antikamnia, ammonol, triphenin, lactophenine, trional, tetronal, exalgine, kyrofine, phenalgin, antipyrine, (pyrazolin), salipyrine.

Acetanilid: Naturally, I have experimented more with this product than with any other, because it is more used, enters into the combination of several popular proprietary powders, and would probably be the diluent or adulterant of other substances. The behavior of acetanilid is peculiar and characteristic. Soon after the two per cent. alcoholic solution is ignited, a yellow fluid ring is formed which grows darker in color, smaller in diameter and larger in band as the alcohol burns. Just before the spirit is consumed the ring of dark brown liquid assumes an unsteady condition, the band enlarging at some points and contracting at others, showing a hesitancy before finally running in and forming a pool of liquid, which almost immediately crystallizes. The time required for this liquid residue to crystallize is often the most noticeable point of difference between two substances, as will be hereafter mentioned. The well known fact that antifebrin and acetanilid are identical is borne out by this procedure, and the popular belief that antikamnia and ammonol each contain acetanilid is also encouraged.

Antifebrin gave results identical to those obtained from acetanilid. I also found that antikamnia washed with water and ammonol treated the same way gave results similar in every respect to that obtained with antifebrin and acetanilid. I am led to believe antikamnia and ammonol contain acetanilid, judging not by the general appearance of the residue alone, but by the similar behavior of all during the burning of the alcohol; noticing the ring, the fluid and the crystals.

Ammonol not washed gives exactly the same residue as the washed, while the residue from a solution of unwashed antikamnia is modified by an admixture of a non-volatile substance. Antikamnia unwashed also presents the peculiarity of slowly crystallizing, while the ammonal residue crystallizes at once like acetanilid. Evidently the ammonium salt is volatilized.

A mixture of phenacetine with acetanilid acts much like acetanilid until the crystallizing point is reached, when the difference is marked; the mixture requiring a long time to solidify. This modification will be found of much use, directly.

Triphenin and lactophenine behave much like acetanilid, though differing in the color of the rings and crystals, both being lighter—triphenin standing intermediate, yet nearer lactophenine. This trio presents results more nearly alike than any other sub-group examined. By mixing a quantity of the solution of each of these with an equal quantity of the phenacetine solution and proceeding with the three mixtures, marked differences in the solidification of residues will appear. The triphenin mixture crystallizes at once while the other two remain liquid some time, acetanilid and phenacetine solidifying from without inward in an irregular manner, while lactophenine and phenacetine solidify most peculiarly, by the formation of successive circular bodies.

In no other instances have I found the use of an "indicator" necessary, and I have refrained from further investigations along this line to avoid confusion and to keep our method as plain and simple as possible. For the same reason I have refused to note flame color peculiarities and crystalline structure.

Trional and tetronal must be grouped together, because, from the ignition of the alcohol to the solidifying point, they are indeed twin sisters; far fairer than and enough unlike their associates to be easily distinguished from them. Their liquid rings and liquid residue are of a decided bright yellow color, as also are the resultant crystals. Tetronal crystallizes at once, trional remains liquid some ten or fifteen minutes. Note the decided point of difference.

Exalgine: Try it. The picture will never be forgotten. A brown indefinite band around the dish, a perfectly clean interspace, one and one-quarter inch in diameter, upon the centre of which seems to have been dropped a mass of rich brown matter. Look carefully at the surface of this and well-defined leaf figures will be seen.

Kyrofine: The same liquid ring is found, yet remains throughout the same color, light brown. The pool of brown liquid remains fluid some time, finally solidifying slowly from a nucleus. The solid mass is *sui generis;* a smooth surface, brown color with the satiny sheen of the miller's wing.

Phenalgin: A dry light-brown ring becomes yellow, then a dirty black. Towards the end of process, inner line of ring or band "fries" violently and runs into the centre, where the mass solidifies into a circle of patches immediately.

Antipyrine, pyrazolin and salipyrine constitute a sub-group. The first two are, as is known, identical and naturally give identical results with our test. All leave the upper surfaces of the dishes stained brown in an irregular way, and when the alcohol is burned off all leave, alike, a purplish brown liquid, spread out over a larger area than is usual with other members of Class B. Antipyrine, and of course pyrazolin, soon crystallize, while sedapyrin remains fluid quite a long time, finally solidifying slowly from a nucleus. In each successive formation a fissure occurs. Final appearance of all much alike, the manner and time of solidification being the only points of difference, yet difference enough. While well aware that antipyrine being soluble gives decided reactions, I have thought these notes regarding it worthy of record.

I scarcely expect this simple (Hynson-Dunning) method for distinguishing and identifying these much-used remedies will at first be considered strictly scientific or quite conclusive, yet in the absence of something better it will, I believe, be found a veritable boon to the busy pharmacist and active practitioner of medicine. In procedure and results it seems to compare quite favorably with some qualitative tests still in vogue, and as a confirmatory test with compounds already well defined, it may be found useful.

DR. LYONS (in the Chair): The Committee on Chairman's Address is ready to report.

Dr. Rusby read the report:

REPORT OF THE COMMITTEE ON ADDRESS OF THE CHAIRMAN OF THE SCIENTIFIC SECTION.

Your Committee on address of the Chairman beg leave to report that they do not deem it appropriate or practicable to enter into a discussion of the facts and details presented, but content themselves with a consideration of its general nature, its relation to general science and to practical pharmacy.

We recognize the great amount of research involved in the contribution and its great richness as a scientific work. It is papers of this class which tend to maintain the dignity of pharmacy as a profession, as well as of our Association, and to show to pure scientists that those engaged in the application of science to art are frequently compelled and are fully qualified to conduct scientific investigation to a point beyond that reached by the former class.

The author has referred especially to his conclusions as indicating genetic chemical relationships, but has disclaimed any consideration of genetic botanical relationships. It must be remarked, however, by your committee that suggestions of such botanical relationships were prominent incidentally throughout the address. There is no department of organic science which is not enriched by such a contribution.

The paper, as presented, bears an aspect of great complexity, and the natural thought arises as to whether the average pharmacist would not feel that such investigations are leading to places whither he cannot follow. But your Committee is of the opinion that this period of complexity is but transitory and incidental to any period of investigation. Just as the nation which is most interested in peace and most desirous of it has frequently to fight its way thereto, so science frequently has to plunge into a condition of complexity and confusion in order that simplicity and certainty may be attained. Such we believe to be the condition of this investigation. *Per aspera ad astra.*

In its relations to practical pharmacy, your Committee is convinced that the present systems of classification referred to by our Chairman are unscientific and not adapted to educational purposes; and yet we feel that we should be conservative in regard to absolutely discarding them before a working substitute has been pretty well elaborated. We hope that it may not be long before the efforts of our Chairman may be crowned with success in the presentation of a teachable scheme embodying the new principles of classification in which he believes.

H. H. RUSBY,
L. E. SAYRE,
A. B. STEVENS.

Upon motion of Mr. Sheppard, the report was received.

THE CHAIRMAN: There is still another committee to hear from, of which Prof. Remington is Chairman.

Mr. Remington stated that the committee had carefully gone over the report on Revision of the Pharmacopœia, and found itself in a delicate position about rendering a report on a report which had already been offered at this Session; that the committee was radically opposed to several of the recommendations made, and yet did not feel justified in bringing in a formal adverse report.

After considerable discussion, participated in by Messrs. Remington, A. R. L. Dohme, Lyons, Bartley, Ryan, Sayre and Rusby, it was decided to refer the original report to a joint committee, consisting of the present Committee of Reference and the new Committee on Revision of the Pharmacopœia for 1898–99, who are to report at the next annual meeting.

Mr. Feil moved that owing to the lateness of the hour, the balance of the papers before this Section be read by title only, and referred to the Committee on Publication. The motion was seconded and carried.

The following is a list of the papers:

Certain Alkaloidal Periodides and the Volumetric Estimation of Alkaloids as Higher Periodides. By A. B. Prescott and H. M. Gordin.

Suggested Process for Deodorized Tincture of Opium. By E. L. Patch.

Specific Gravity Tables for Solutions of Citric Acid of Different Strengths. By A. B. Lyons.

Decomposition of Iodoform by Light. By Edw. Kremers and E. C. W. Koske.

Do the Present Methods of Preserving Infant Foods Insure their Perfect Sterility? By Owen W. Krueger.

Bezoars and Bezoardics. By E. H. Gane.

The Standardization of Volumetric Acid and Alkali. By W. A. Puckner.

Notes on Estimating Eucalyptol. By Lyman F. Kebler.

Condensation of Volume in Alcoholic Distillates. By A. B. Lyons.

Amyl Nitrite and its Assay. By R. Fischer and J. A. Anderson, under direction of Edw. Kremers.

Practical Usefulness of Calcium Phosphate in Pharmacy. By Joseph Feil.

On Some Liquid Foods. By E. H. Bartley.

THE CHAIRMAN: The next order of business will be the election of officers for the ensuing year. The nominee for the position of Chairman is Dr. Rusby, and for the position of Secretary, Mr. Arny.

Upon motion of Mr. Alpers it was ordered that the nominations be closed.

MR. STEVENS: I move that the Secretary be instructed to cast an affirmative ballot electing Dr. H. H. Rusby as Chairman, and Mr. H. V. Arny as Secretary of this Section.

Carried.

The Secretary notified the Section that he had performed this duty.

THE CHAIRMAN: The installation of officers is now in order, and I will call upon Mr. Dohme and Mr. Stevens to conduct the Chairman-elect to the platform.

These gentlemen escorted Dr. Rusby forward, and Chairman Kremers said:

Gentlemen of the Scientific Section, I congratulate you upon the wisdom of your selection. Permit me to introduce to you your new Chairman, Dr. H. H. Rusby. (Applause.)

Dr. Rusby took the Chair and announced that the same committee would escort the new Secretary to the platform, which duty being performed, the Chairman introduced him to the Section.

DR. RUSBY: I suppose a speech is in order, and so I will remark that I am thankful for this honor. It seems that chairmen of scientific sections are no longer elected because of scientific ability. My predecessor was an exception. Just as our universities are electing presidents because they have money, so you are electing chairmen because they are strong and apparently able to maintain order, which I shall try to do next year. (Laughter.) I am glad you are good-natured and law-abiding. I can not but appreciate the honor you have conferred upon me.

MR. ARNY: I desire to thank you exceedingly, gentlemen, for this honor. I hesitated considerably about accepting the position, but having an eminent scientist at the head of the Section, I finally decided to take it, because I thought I could do some good work. I urge the Chairman to consider me as a working-man on the committee. From a scientific point I remain in the background, but I will try to do some work.

The Chair announced Mr. W. L. Scoville, of Boston, as the third member of the Committee on Scientific Papers.

The Chair also announced that it was in order to elect two members on the Committee on Research.

MR. KREMERS: It affords me a great deal of pleasure to nominate for that position Mr. A. B. Prescott, and I move that the Secretary be instructed to cast an affirmative ballot for him.

The motion prevailed, and the Secretary announced that he had performed that duty.

Mr. Thompson nominated Prof. Lloyd as the other member of the committee, and Mr. Kremers moved that the Secretary be instructed to cast an affirmative ballot for him, which motion prevailed, and the Secretary acted accordingly.

THE CHAIRMAN: Unless there is some other new business, we will proceed with the reading of the minutes.

Mr. Ryan moved that the minutes prepared by the Secretary be approved without reading. Carried.

Upon motion of Mr. Ryan, the Section adjourned.

PAPERS READ BY TITLE.

CERTAIN ALKALOIDAL PERIODIDES, AND THE VOLUMETRIC ESTIMATION OF ALKALOIDS AS HIGHER PERIODIDES.*

BY A. B. PRESCOTT AND H. M. GORDIN.

THE PERIODIDES IN RESPECT TO COMPLETENESS OF PRECIPITATION.

In aqueous solutions of salts of the alkaloids, one of the most delicate of qualitative reagents is iodo-potassium iodide. Wormley gives the limit of this precipitation, for the chief medicinal alkaloids, as from $\frac{1}{50000}$ to $\frac{1}{100000}$ of a grain of the alkaloid in one grain of water, that is, from 0.0000013 to 0.0000007 gramme in one cubic centimeter of water.† The precipitate is not appreciably soluble in excess of the reagent, an advantage over several other qualitative precipitations of alkaloids in general. In some cases the precipitate is appreciably soluble in excess of the alkaloidal salt, and this condition is one most easy to avoid. The potassium iodide solution of iodine was recommended as a reagent for alkaloids by Bouchardat, a medical writer in Paris, in 1839. ‡

As a volumetric solution of iodine, the decinormal solution with potassium iodide was first proposed by Wagner, in 1861,§ and the decinormal strength is generally the most suitable for volumetric use.

HISTORICAL AS TO THE FORMATION OF PERHALIDES IN GENERAL.

The formation of the alkaloidal periodides was first made a subject of systematic observation by Jörgensen at Copenhagen, in 1869,‖ and the masterly researches of this Danish chemist, extending over nine years, afford a model of logical inquiry into chemical structure. A still wider study of all periodides and some other perhalides of organic bases was commenced in 1887, by Prof. Geuther,¶ of Jena, but was cut short by his death in 1889. Among various periodides reported of later years have been picoline periodides by Wm. Ramsay in 1878 ;** caesium and rubidium periodides by Wells and others in 1893;[*] iodonium periodides by Victor Meyer in 1894;[†] sulphon periodides by Kastle in 1894;[‡] periodides of diazo-bodies by Hantsch in 1895;[§] halogen addition products of the anilides by Wheeler and others in 1896–97;[||] perhalides of aliphatic amines by Norris in 1898;[¶] mixed perhalides of alkyl-anilines by Samtleben in 1898.[**]

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* The portion of this article which concerns atropine was given in substance in J. Am. Chem. Soc., May, 1898, vol. xx, p. 329, under the title "Atropine Periodides and Iodomercurates, by H. M. Gordin and A. B. Prescott" (reprints). Also that concerning morphine and opium, except the "Results of Opium Assay," appeared in Kremers' Pharmaceutical Archives, June, 1898, vol. i, p. 121, under the title "A Volumetric Assay of Opium, by H. M. Gordin and A. B. Prescott" (reprints).

† Microchemistry of Poisons, 1885, Tabular View.

‡ Bouchardat, 1839: Compt. rend., *9*, 475: L'Institut, *7*, 358. This precipitation, however, was proposed as an antidote for strychnine, in cases of poisoning of dogs. Further, see Donné, Ann. chim. phys. (2), *38*, 82.

§ R. Wagner, Dingler's polyt. J., *161*, 40; Zeitsch. anal. Chem., *1*, 102.

‖ Jörgensen, 1869–1878, J. prakt. Chem. (2), *2*, 347, 433; *3*, 145, 328; *14*, 213, 356; *15*, 65, 418; *16*, 352. Ber. d. chem. Ges., *2*, 460.

¶ A. Geuther, Ann. Chem. Pharm. (Liebig), *240*, 66–91, with lists of the organic periodides previously obtained.

** Phil. Mag. (5), *2*, 269; *4*, 241; *6*, 19.

In this laboratory since 1895 the perhalides and various double halides of pyridine have been obtained,[††] also the perhalides of caffeine,[‡‡] and work on picoline perhalides is in hand. In the course of work upon an entirely different inquiry a new order of perhalides has just been obtained, a periodide of bromtriphenylmethane.[§§]

It is of interest to inquire what classes of compounds are liable to the formation of perhalides, and this inquiry has a special interest when it is proposed to estimate a single class of compounds, in vegetable drugs or their extracts, for formation of periodide. In general terms the reply is easily given, that periodides are limited to the organic bases, that is the more or less basic compounds of the nitrogen family of elements, and the inorganic alkalies. It is remarkable that the iodonium compounds yield periodides, which is quite in accord with the claim of Victor Meyer that in these bodies iodine itself strangely serves with the benzene ring as a base-forming element like a member of the nitrogen family. This view is supported further by Gomberg's production at this time of a periodide of a triphenylmethane derivative, as cited just above.

At present it seems highly improbable that any plant constituents other than the alkaloids, in the larger sense of organic bases, are of the sort of bodies which can form periodides in precipitation. Moreover, Wagner's reagent is used in a qualitative way along with plant analysis to an extent likely to call attention to any interference with its use for alkaloids. From the work of Wheeler it is evident that periodides may be formed by acid amides, but probably not by precipitation in dilute solutions. The formation of iodonium periodides, and a sulphon periodide, indicate that the limits of formation of perhalides cannot yet be declared, and it will be well for analysts to be watchful of new developments.

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[*] Am. J. Sci. (3), *44*, 42; *43*, 17.

[†] Ber. d. chem. Ges., *27*, 1594.

[‡] Am. Chem. J., *16*, 116.

[§] Ber. d. chem. Ges., *28*, 2754.

[||] Am. Chem. J., *18*, 85, and *19*, 672.

[¶] Am. Chem. J., *20*, 51.

[**] A. Samtleben, Ber. d. chem. Ges., *31*, 1141.

[††] Prescott, the Periodides, J. Am. Chem. Soc., *17*, 775; Pharm. Rundschau, *13*, 233. Prescott and Trowbridge, Periodides of Pyridine, J. Am. Chem. Soc., *17*, 859. Flinterman and Prescott, Dipyridine Methylene Dibromide, *Ibid.*, *18*, 28. Prescott, Pyridine Alkyl Iodides, *Ibid.*, *18*, 91. Trowbridge, Periodides of Pyridine, *Ibid.*, *19*, 322. Trowbridge and Diehl, Halides and Perhalides of Pyridine, *Ibid.*, *19*, 558.

[‡‡] Gomberg, Perhalides of Caffeine, J. Am. Chem. Soc., *18*, 347–378.

[§§] Gomberg, Boston meeting of Am. Chem. Soc.

HISTORICAL AS TO ANALYTICAL USE OF PERIODIDES.

The volumetric use of potassium iodide aqueous solution of iodine dates from Wagner in 1861,* and the solution in decinormal strength of iodine is named Wagner's Reagent.

This iodine solution was tried briefly by Schweissinger in 1885,† and at length by Kippenberger in 1895,‡ but both seem to have obtained the lower periodides, at least in part, in their methods of estimation. The last named author proceeded upon a volumetric deduction of a general formation of triiodides, and sought to so vary the conditions as to support the factor of the triiodide. In 1896, Gomberg,§ along with his production of caffeine perhalides above referred to, established the volumetric estimation of caffeine in acidulated solutions as a pentaiodide, and this was used, with a method of extraction from kola, throughout the work of Mr. Knox and one of us,|| upon the caffeine compound of kola, with complete satisfaction.

THE HIGHER PERIODIDES IN RESPECT TO CONSTANCY OF COMPOSITION.

The number of the periodides of pyridine is representative of the fact that most of the alkaloids of pyridine-derived constitution will form each more than one periodide, according to conditions. We find it is more expedient to secure the exclusive formation of the higher periodide, by needful conditions, than that of other periodides obtainable. The higher

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* R. Wagner, 1861: Ding. polyt. J., *161*, 40; Zeitsch. anal. Chem., *1*, 102. Wagner wisely avoided washing the precipitate, but he failed to add the solution of alkaloid to that of iodine: "Man versetzt die Lösung der Basen, deren Menge man bestimmen will, mit überschüssiger Iodlösung, filtrirt und bestimmt in einem gemessenen Theil des Filtrats mit unterschwefligsaurem Natron das überschüssige Iod." As periodides had not then been prepared and analyzed, the iodine factors of Wagner were empirical, and, as the higher periodides are not invariably the sole products when iodine solution *is added* to the alkaloid solution, the factors adopted proved unsatisfactory. It is noteworthy that "Mayer's reagent" was so nearly contemporaneous with Wagner's in publication. The potassium mercuric iodide method of volumetric estimation dates from 1862: Proc. Am. Pharm. Assoc., p. 230; Am. J. Pharm., *35*, 20; Chem. News, *7*, 159; *8*, 177, 189. Of special American interest is Dr. F. Hoffmann's biography of Ferdinand F. Mayer as a New York chemist (Phar. Rundschau, 1894, *12*, 125), and of more general interest, Prof. Schaer's history of Mayer's alkaloid reagent (Pharm. Rundschau, *12*, 142).

† Arch. Pharm., 1885, p. 611.

‡ K. Kippenberger, 1895; Zeitsch. anal. Chem., *34*, 317; *35*, 407, 422.

§ J. Am. Chem. Soc., *18*, 331.

|| Knox and Prescott, Proc. Am. Phar. Assoc., *44*, 128; *45*, 131; J. Am. Chem. Soc., *19*, 63; *20*, 34.

periodides are not surpassed in completeness of precipitation, and they are sufficiently stable. At least this is true of those alkaloids included in this report. In future reports we desire to be able to give analyses of all the readily obtained periodides of each of the alkaloids under treatment.

If we add the iodo-potassium iodide solution to the solution of an alkaloidal salt, keeping from the beginning to the end the alkaloid in excess, it is generally the lowest periodide (in most cases a triiodide) that is formed, but if the order be reversed and the alkaloidal solutions added to the iodo-potassium iodide solution, keeping all the time a large excess of iodine, it is generally the highest periodide that is formed. We have found this rule to hold good with atropine, strychnine, brucine, aconitine and several other alkaloids. It was mainly the lower periodides of alkaloids that were made and described by Jörgensen; they are generally very stable, and can be easily obtained in crystalline form by recrystallization from some suitable solvent. As to the higher periodides some of them are stable enough to be recrystallizable, many others are easily decomposed in solution into free iodine and lower periodides. Atropine enneaiodide belongs to the first class, strychnine heptaiodide and brucine heptaiodide belong to the second.

Following the above mentioned rule, we have succeeded in obtaining an enneaiodide of atropine, $C_{17}H_{23}NO_3HI.I_8$; a heptaiodide of strychnine, $C_{21}H_{22}N_2O_2HI.I_6$; a heptaiodide of brucine, $C_{23}H_{26}N_2O_4HI.I_6$, and, as it is probable, a triiodide and a heptaiodide of aconitine. The tetraiodide of morphine obtained by Jörgensen, is the only periodide of morphine that we have been able to make.

These compounds are of the common order of alkaloidal hydriodide periodides. The single atom of iodine in the normal hydriodide is transposed by silver nitrate solution with precipitation, but does not respond to reducing agents. The rest of the iodine, being additive to the first atom of this element, is very easily taken up by reducing agents, such as sulphur dioxide, a thiosulphate, or powdered zinc.

PREPARATION OF THE HIGHER PERIODIDES IN PURITY FOR ANALYSIS.

The periodides of which analysis is given in this paper were all made according to the following method: One gramme of the alkaloid was dissolved in about two hundred Cc. of water acidulated with sulphuric or hydrochloric acid, and the solution poured, in small quantities at a time, into five hundred Cc. of water containing one per cent. free iodine and one and one-half per cent. potassium iodide. After shaking till the liquid became perfectly clear, the mother liquor was removed in filtration by means of a pump, the precipitate well washed with cold water and dried first on porous plates and then in a vacuum over sulphuric acid. For the aconitine triiodide the order of mixing was reversed, and an excess of aconitine kept during the whole operation. After drying, the precipitate was recrystallized from alcohol. These periodides so prepared were subjected to analysis by the method given under atropine below, and as stated further under the several alkaloids, and from the results of the analysis the volumetric factor of free iodine for each alkaloid was determined.

ATROPINE ENNEAIODIDE AND ITS ANALYSIS.

The enneaiodide, obtained as above described, is a very dark brown, almost black powder, quite permanent in dry air, and has only a slight odor of iodine. It is very difficultly soluble in ether, chloroform, benzene, or carbon disulphide, but is soluble in alcohol very freely when hot. In cold water it is insoluble; hot water decomposes it quickly; it is also decomposed by concentrated solutions of potassium iodide. At 90° C. it commences to give up iodine vapors, and at 140° C. melts to a dark liquid. To obtain it in crystalline form it is first washed with a little cold alcohol to remove traces of free iodine, and then dissolved in warm alcohol. On cooling, it crystallizes out in dark-green prisms and leaflets, having the same properties as the non-crystallized body. In analysis the additive iodine we estimated volumetrically, and the total iodine both gravimetrically and volumetrically.

To estimate the additive iodine a small quantity of the enneaiodide is dissolved in very little alcohol, an excess of a standardized solution of sodium thiosulphate added, and the excess titrated back with a standard solution of iodine, using starch as the indicator.

For total iodine the substance is covered with an excess of powdered metallic zinc and some water, and then boiled gently for ten or fifteen minutes, taking care to prevent loss by spurting; the mixture is then thrown upon a filter, and the containing flask and the filter are thoroughly washed with hot water. The iodine in the zinc iodide thus formed can either be estimated by precipitation with silver nitrate and nitric acid and weighing as silver iodide, or it is precipitated with an excess of a standardized solution of silver nitrate and the excess titrated back with a standard solution of ammonium thiocyanate, using ferric nitrate as indicator.

In the following analyses the standard silver nitrate solution was made to correspond with one per cent. of iodine, and the ammonium thiocyanate solution to correspond, Cc. per Cc., with the silver nitrate solution. The standard solution of iodine contained one per cent. of iodine and the sodium thiosulphate solution corresponded, Cc. per Cc., with the iodine solution.

Analysis of the atropine enneaiodide not recrystallized: Volumetric estimation for total iodine, 0.15225 Gm. required 12.2 Cc. of the silver nitrate solution. For the iodine removed by reduction, 0.19255 Gm. required 13.7 Cc. of the thiosulphate solution.

	Calculated for $C_{17}H_{23}NO_3.HI.I_8$.	Found.
Iodine by reduction	70.88	71.15
Total iodine	79.74	80.13

In the gravimetric estimation, from 0.218 Gm. was obtained 0.3207 Gm. silver iodide.

	Calculated for $C_{17}H_{23}NO_3.HI.I_8$.	Found.
Total iodine	79.74	79.48

Analysis of the atropine enneaiodide recrystallized from alcohol. The methods employed were the same as with the non-recrystallized compound and the standard solutions of the same strength.

In the volumetric estimation of total iodine, 0.12685 Gm. required 10.1 Cc. of the silver nitrate solution. For the iodine removed by reducing agents, 0.23105 Gm. required 16.4 Cc. of the thiosulphate solution.

	Calculated for $C_{17}H_{23}NO_3.HI.I_8$.	Found.
Total iodine	79.74	79.62
Iodine by reduction	70.88	70.98

In the gravimetric estimation of total iodine 0.2031 Gm. gave 0.30035 Gm. silver iodide.

	Calculated for $C_{17}H_{23}NO_3.HI.I_8$.	Found.
Total iodine	79.74	79.90

The constitution of the compound is that of atropine hydriodide octa-iodide. The alkaloidal hydriodide is formed, in the (acidulated) solution, by transposition of the alkaloidal salt taken with potassium iodide. Thus: $C_{17}H_{23}NO_3.HCl + KI + I_8 = C_{17}H_{23}NO_3.HI.I_8 + KCl$.* Therefore the ratio of the free iodine consumed to the absolute atropine, is the ratio of I_8 to $C_{17}H_{23}NO_3$, equal to ratio 1012 24 to 288.38, or of 1 of iodine to 0.2849 of atropine. And 1 Cc. of decinormal iodine solution consumed is equivalent to 0.0036048 Gm. of the atropine. *This decinormal factor* was found to hold good under the control estimation reported further on.

OTHER ATROPINE PERIODIDES AND ATROPINE MERCURIC IODIDES.

Having obtained the enneaiodide of atropine it was natural to suppose the existence of a heptaiodide, with probabilty of a complete series from the triiodide to the enneaiodide. And in fact in the course of our work we once obtained this heptaiodide. But our efforts to determine the exact conditions necessary for the formation of this body have so far not been successful. Whether additional quantities of atropine will make the precipitate take up more atropine and become a lower periodide we shall try to determine by later experiments. On the other hand when the order is reversed and the iodine solution is added to the atropine solution, it is always a lower periodide that is formed; but whether on continued addition of the iodine the precipitate will take up more of it and become a higher periodide, we cannot say as yet.

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* For experimental verification of this equation, see a later paragraph in this paper.

The easiest way to obtain the periodides of atropine is to use chloroform as a solvent. On adding twenty grammes atropine to a warm solution of thirty grammes iodine in chloroform (500 Cc.), the enneaiodide crystallizes out very soon in the shape of small, shining, dark-green crystals. If these be removed by filtration, the mother-liquor will give several successive crops of the dark blue pentaiodide, and at last a crop of the brownish-red triiodide.

Atropine Mercuric Iodides are best known as products of precipitation of atropine salts by Mayer's reagent, the solution of potassium mercuric iodide.* We find that they can be obtained by shaking the alcoholic solution of a periodide with metallic mercury and warming the mixture. Double iodides of atropine and mercury can also be made by mixing theoretical quantities of atropine and iodine, adding a little alcohol and an excess of mercury, slightly warming, and shaking till the color of iodine disappears. If the higher periodides of atropine be used in the preparation of this double iodide of atropine and mercury, there is always separation of mercurous iodide; but if theoretical quantities of atropine and iodide are used, there is no separation of mercurous iodide. The formula of this double iodide of mercury and atropine, as shown by our analysis, seems to be $C_{17}H_{23}NO_3.HI.HgI_2$. It resembles in composition several other double iodides of alkaloids and mercury obtained by Groves by a different method, and agrees in proportion with the strychnine compound, not with the morphine or quinine compound obtained by one of us in 1880.† But besides this double iodide we also obtained another having the composition $(Atrop.HI)_2.HgI_2$. It was made by treating a solution of the $Atrop.HI.HgI_2$ in diluted alcohol with an excess of potassium iodide. From the liquid obtained by shaking an alcoholic solution of atropine and iodine with mercury the monoatropine hydriodide mercuric iodide crystallizes out in shining yellow crystals, melting at 80° to 90° C., difficultly soluble in ether or chloroform, partly soluble in hot water, and very soluble in warm alcohol. The diatropine hydriodide mercuric iodide obtained as said above by the action of potassium iodide on the mono compound, crystallizes in perfectly white, silky needles, which on being dried assume a yellowish tint. They melt at 98° to 99° C., are very easily soluble in warm alcohol, and quite soluble in hot water.

The analysis for mercury and for iodine in these bodies can be made in different ways, but the best results are obtained by a modification of the method of Risse.* The mercury and the iodine are determined in two separate portions. For mercury the substance is dissolved in a little warm alcohol, and a little water added; the solution is then acidulated with a few drops of dilute hydrochloric acid and saturated with hydrogen sulphide. The mercuric sulphide is then dried and weighed in the usual way. For the determination of iodine the substance is treated with a hot solution of potassium hydroxide (1 : 10), diluted with water, filtered, and when completely cold, neutralized with acetic acid. The iodine is now precipitated with silver nitrate and nitric acid, and determined as silver iodide in the usual way.

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* Groves, 1859, Quar. J. Chem. Soc., *11*, 97, 188. F. F. Mayer, 1862; Am. J. Phar., *35*, 20; Chem. News, *7*, 159; *8*, 177, 189. Prescott, 1880: Am. Chem. J., *2*, 294; *14*, 606.

† Prescott, Am. Chem. J., *2*, 297.

In the following analyses the standard silver nitrate solution was made to correspond with one per cent. of iodine, and the ammonium thiocyanate solution to correspond Cc. per Cc. with the silver nitrate solution. The standard solution of iodine contained one per cent. of iodine, and the sodium thiosulphate solution corresponded, Cc. per Cc., with the iodine solution.

Analyses of the double salts of atropine hydriodide and mercuric iodide: 0.2632 gramme of the monoatrapine hydriodide mercuric iodide gave 0.0699 gramme mercuric sulphide, and 0.30445 gramme of the substance gave 0.24785 gramme of silver iodide.

	Calculated for $C_{17}H_{23}NO_3HI.HgI_2$.	Found.
Mercury	23.03	22.89
Iodine	43.74	43.98

Of the diatropine hydriodide mercuric iodide, 0.1798 gramme gave 0.032 gramme mercuric sulphide, and 0.257 gramme of the substance gave 0.18885 gramme silver iodide.

	Calculated for. $(C_{17}H_{23}NO_3HI)_2HgI_2$.	Found.
Mercury	15.58	15.34
Iodine	39.46	39.70

STRYCHNINE HEPTAIODIDE AND ITS ANALYSIS.

The heptaiodide of strychnine is a dark brown powder hardly soluble in ether, chloroform or benzol, and requires considerable alcohol for solution. It cannot be recrystallized, as it is easily decomposed into free iodine and the triiodide.†

The total iodine was determined by silver nitrate after reduction with zinc and ammonia. The additive iodine was estimated after dissolving the periodide in alcohol, by titrating with thiosulphate.

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* Ann. Chem. (Liebig), 107, 223.

† A triiodide was reported by Tilden in 1865 (See Geuther's lists, *loc. cit.*).

For total iodine :

1. 0.3816 of the periodide gave 0.51345 silver iodide.
2. 0.30625 gave 0.4112 silver iodide.

	Calculated for. $C_{21}H_{22}N_2O_2.HI.I_6$	Found.
1.	72.66	72.70.
2.	——	72.54

For additive iodine :

1. 0.1754 of the substance was found to contain 0.109 free iodine.
2. 0.17805 contained 0.111 free iodine.

	Calculated for $C_{21}H_{22}N_2O_2.HI.I_6$	Found.
1.	62.28	62.14
2.	——	62.34

Six atoms of iodine coming from the free iodine of the iodo-potassium iodide solution, we get the ratio : I_6 to $C_{21}H_{22}N_2O_2$, or 1 of iodine to 0.439 of strychnine absolute. This gives the *decinormal factor* (the value of 1 Cc. of decinormal iodine solution) as 0.0055547 for strychnine.

BRUCINE HEPTAIODIDE AND ITS ANALYSIS.

This was made according to the general method already given, by pouring a half per cent. solution of brucine acidulated with hydrochloric acid into a large excess of a one per cent. solution of iodine. In appearance and solubility it closely resembles the heptaiodide of strychnine, but it exercises a strong reducing action on silver salts, so that its analysis for total iodine is best accomplished by the aid of nitrous acid and bisulphide of carbon, as described under the head of morphine tetraiodide and its analysis.

For total iodine :

1. 0.1916 of the periodide was found to contain 0.13229 total iodine.
2. 0.2395 of the periodide contained 0.16536 total iodine.

	Calculated for $C_{23}H_{26}N_2O_4.HI.I_6$.	Found.
1	69.21	69.04
2	——	69.04

For additive iodine :

1. 0.1622 of the substance contained 0.096006 free iodine.
2. 0.192 contained 0.114 free iodine.

	Calculated for $C_{23}H_{26}N_2O_4.HI.I_6$.	Found.
1	59.32	59.19
2	——	59.37

For brucine, therefore, the ratio is I_6 to $C_{23}H_{26}N_2O_4$, or 1 of iodine to 0.5179 of brucine, anhydrous. And 1 Cc. of strictly decinormal solution of iodine indicates 0.0065530 of brucine, *the decinormal factor*, subjected to trial as stated later.

MORPHINE TETRAIODIDE AND ITS ANALYSIS.

Two samples were made. In the first, one gramme of morphine dissolved in 200 Cc. acidulated water was added to a solution of 5 grammes iodine and 7½ grammes potassium iodide in 500 Cc. water, the mixture shaken till supernatant liquid was perfectly clear, and the precipitate washed and dried in vacuo. In the second, 2 grammes iodine and 3 grammes potassium iodide were dissolved in 200 Cc. water, and the solution poured slowly into a solution of morphine containing 3 grammes morphine in 600 Cc. acidulated water. The analysis, as given below, showed that the precipitate in both cases was the same, namely, $C_{17}H_{19}NO_3HI.I_3$. This compound, morphine tetraiodide, was made known by Jörgensen in 1870.* We find it to be the only periodide formed by morphine under any of the conditions of this precipitation from aqueous solutions.† It is notable that in this periodide the base as a monamine holds an even number of atoms of total iodine.‡ The periodide precipitate of morphine is practically insoluble when the iodine solution is in excess, though appreciably soluble when the morphine solution is in excess, as it is in pure water, the more so if strongly acidulated.

In the analysis of the morphine periodide, the precipitate is to be collected and quickly washed with water by the aid of the pump, and then dried in vacuo over sulphuric acid to a constant weight. The additive iodide is readily determined, in a weighted portion, by dissolving in alcohol, and titrating with a standard solution of sodium thiosulphate as stated in previous paragraphs. The total iodine determination in this compound gives special difficulty, as neither the sulphur dioxide nor the powdered zinc, previously used in this laboratory for analytical reduction of periodides, works well with morphine periodide, but the following procedure suffices. The periodide is covered with powdered zinc and stronger water of ammonia, and set aside half an hour, the mixture is then heated on the water bath till all the ammonia is driven off, avoiding loss by spurting. A little water is now added, and the mixture boiled about ten minutes. The whole is filtered into a separator of about 500 Cc. capacity, the excess of zinc well washed with hot water, and water added to make 200 or 300 Cc. When perfectly cold, the mixture is acidified slightly with very dilute sulphuric acid, then 20 Cc. of carbon disulphide are poured into the separator, and ten or twelve drops of concentrated sulphuric acid *saturated with nitrous acid* are added. The separator is closed and shaken, and the solution of iodine in carbon disulphide carefully run out upon a wetted filter. Fresh carbon disulphide is added in the separator, and the separation repeated till all the iodine is removed. The iodine is now washed on the filter, first with water, then with a very weak solution of sodium bicarbonate. It is then run into a flask, and 30 Cc. of a solution of sodium bicarbonate, five grammes to the litre are added. Finally, the iodine is titrated with the standard solution of sodium thiosulphate. The results were as follows:

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* J. pr. Chem. (2), *2*, p. 437.

† A lower periodide of morphine was obtained by evaporation of an alcoholic solution containing excess of morphine, by H. R. Bauer (Arch. Pharm. (3), *5*, 289-309.

‡ The present hypothesis of structure of periodides would imply, therefore, that the compound is a di-morphine-octaiodide (J. Am. Chem. Soc., *17*, 780; *19*, 331).

I. Iodine in excess:

0.2692 gave 0.13 additive iodine and 0.2732 gave 0.174311 total iodine.

	Calculated for $C_{17}H_{19}NO_3.HI.I_3$	Found.
Additive iodine	48.02 per cent.	48.29 per cent.
Total iodine	64.03 “	63.80 “

II. Morphine in excess:

0.3155 were found to contain 0.152832 additive iodine and 0.2708 contained 0.172076 total iodine.

	Calculated for $C_{17}H_{19}NO_3.HI.I_3$.	Found.
Additive iodine	48.02 per cent.	48.44 per cent.
Total iodine	64.03 “	63.54 “

For morphine the ratio is I_3 to $C_{17}H_{19}NO_3$, or ratio of 379.59 to 284.38, that is 1 of free iodine consumed to 0.74918 of morphine anhydrous. And 1 Cc. of strictly decinormal solution of iodine corresponds to 0.0094794 of morphine.

ACONITINE HEPTAIODIDE (?) AND ITS ANALYSIS.

The alkaloid we used was obtained from Merck and marked “From Aconitum Napellus, crystallized, pure.” The periodide was made according to the general plan of obtaining the highest periodide of an alkaloid.

For additive iodine.

0.2588 contained 0.126886 free iodine, and 0.1471 contained (by nitrous acid method) 0.082271 total iodine.

	Calculated for $C_{33}H_{45}NO_{12}.HI.I_6$.	Found.
Additive	49.58 per cent.	49.03 per cent.
Total	57.85 “	55.93 “

We make our calculations upon the aconitine formula of Dunstan (J. Chem. Soc., *67*, 459). The formula of Freund (Ber. d. chem. Ges., *27*, 722), though distinctly different in constitution, gives but slightly different molecular weight. Other proposed formulæ approach the same molecular weight. $C_{34}H_{47}NO_{11} = 643.55$ (Freund); $C_{33}H_{45}NO_{12} = 645.54$

(Dunstan); $C_{33}H_{47}NO_{12} = 647.54$ (Jürgens); $C_{33}H_{43}NO_{12} = 643.54$ (Wright and Luff).

An insufficiency of the aconitine in our hands prevented our making duplicate estimations. With both the higher and the lower periodide, it is to be seen that the total iodine found is somewhat too low for the calculated quantity of this element, calculating for heptaiodide and triiodide respectively. The additive iodine in both cases falls below calculation, but not enough below to discredit the formulæ. When we return to these estimations with a larger supply of the alkaloid, we shall find whether the instability of aconitine will prevent constant results in analysis of the higher periodide or not.

ACONITINE TRIIODIDE (?).

This was made by adding a one per cent. solution of iodine to an acidulated solution of aconitine, leaving the latter in excess, and recrystallizing the precipitate from alcohol. Thus obtained it forms beautiful brown-red crystals, very soluble in alcohol, insoluble in water and hardly soluble in ether, benzene or chloroform. Melting point 211–212° C.

For additive iodine.

0.1773 of the substance contained 0.042352 free iodine.

Calculated for $C_{33}H_{45}NO_{12}.HI.I_2$	Found.
24.69	23.89

For total iodine by the aid of nitrous acid and carbon disulphide, as given under the head of morphine.

0.2111 contained 0.07505 total iodine.

Calculated for. $C_{33}H_{45}NO_{12}.HI.I_2$	Found.
37.03	35.56.

VERIFICATION OF THE EQUATION FOR THE IODINE FACTOR.

Partly from the fact that Kippenberger * has proposed a different reaction in the formation of periodide precipitates, and for other reasons, we thought it advisable to prove irrefutably that the potassium iodide of the iodide solution takes an active part in the reaction by which the atropine enneaiodide, as an example, is formed and that in fact the metallic iodide gives off an amount of iodine which is just equal to the amount of the normal iodine of the enneaiodide.

We proceeded in the following manner: We first determined the strength of our iodine solution with regard to free iodine. This was done by means of a sodium thiosulphate solution of known strength. We then

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* Zeitsch. anal. Chem., *35*, 10; *34*, 317. On this question also see Gomberg, 1896: J. Am. Chem. Soc., *18*, 332.

took ten Cc. of this iodine solution and determined the total amount of iodine, free as well as bound to potassium, by shaking them in a flask with an excess of powdered metallic zinc till the color of iodine disappeared, filtering the solution of zinc iodide and potassium iodide thus obtained, washing the flask and the excess of zinc with hot water and precipitating the iodides in the filtrate with silver nitrate and nitric acid. From the weight of silver iodide washed and dried in the usual way, we calculated the amount of total iodine present in our iodine solution. By subtracting the amount of free iodine from that of the total iodine we obtained the amount of iodine present in our solution as potassium iodide. We thus found that the iodine solution contained one per cent. free iodine, and 1.2312 per cent. combined iodine.

We then put 40 Cc. of this iodine solution in a 100-Cc. measuring flask, added 20 Cc. of a three-tenths per cent. solution of atropine alkaloid, and after shaking well, diluted the liquid in the flask to 100 Cc. We now took two vials, and in each filtered off 25 Cc. from the flask. In the first vial, the amount of free iodine titrated back with sodium thiosulphate was found to be 0.0465. From this it is easy to deduce that the twenty Cc. of the three-tenths per cent. atropine solution consumed 0.214 gramme of the free iodine. In the second vial, the total iodine was determined in the same way as described above, and the quantity of silver iodide was found to be 0.3023 gramme, which shows that after the treatment with atropine the liquid contained 1.633 per cent. total iodine. From these data we deduce that the twenty Cc. of the atropine solution have taken up 0.02528 gramme iodine from the bound iodine. As the twenty Cc. of atropine solution contained 0.06 gramme atropine, we find for 100 parts of precipitated ennaiodide :

	Found. Per cent.	Calculated. Per cent.
Atropine	20.05	20.26
Iodine taken from the free iodine of the iodine solution	71.50	70.88
Iodine from the iodine bound as KI	8.45	8.86

We see that in aqueous acidulous solutions the potassium iodide takes an active part in the reaction by joining in a yield of hydriodic acid for the normal hydriodide of the alkaloid necessary to hold the additive iodine of the periodide. When carbon disulphide or carbon tetrachloride is used as a solvent for the atropine and the iodine, no periodide seems to be formed, possibly for the reason of there being no generation of hydriodic acid for the making of hydriodide. As to the formation of the periodides in chloroformic solution of atropine and iodine, it might possibly be explained by the substituting action of iodine either upon the chloroform or upon a side-chain of the atropine.

The direct substitution of iodine for some of the hydrogen in these bodies might, in this case, be made possible by the presence of the natural base which combines with the hydriodic acid, when formed by such a substitution. Part of the atropine would then act in a manner similar to that of mercuric oxide, which is usually employed in the iodizing of hydrocarbons. An analogous case we have in the easy substitution of iodine for some of the hydrogen in aniline, a part of which combines with the hydriodic acid, which is set free through the substitution of iodine for hydrogen in another part. At any rate, we shall endeavor to determine the by-products formed when atropine enneaiodide is produced in chloroformic solutions.

PROCEDURE IN THE VOLUMETRIC METHOD.

The general mode of procedure in the estimation of the strength of an aqueous solution of an alkaloidal salt is as follows: To about ten Cc. of decinormal iodine solution diluted with a little water one Cc. of the acidulated alkaloidal solution is added, and the mixture well shaken for a few minutes. Should the precipitate separate out very quickly and the clear supernatant liquid have only a light yellow or greenish color or be altogether colorless, the alkaloidal valuation is too strong and must be diluted, till after a few trials the clear supernatant liquid retains a very dark red color after the separation of the precipitate. The acidulated alkaloidal solution is then made up to a given volume, and ten or fifteen Cc. of it are run from a burette into a graduated vessel, into which has been previously put twenty-five or thirty Cc. decinormal iodine solution diluted with a little water. The mixture is then made up to a given volume and shaken till the supernatant liquid is perfectly transparent, and is of a very dark red iodine color. This point is very important, and should the clear liquid not have this dark red color, the experiment with most alkaloids (except morphine and possibly some others) should be repeated, putting more decinormal iodine into the graduated vessel, or decreasing the number of Cc. of the alkaloidal solution. It would not do to add more decinormal iodine to the same mixture, as the iodine must be in large excess during the whole operation, in order to prevent the formation of lower periodides which once formed might not take up fresh iodine, and form higher periodides. Only with morphine which in such solutions forms but one periodide, these precautions are unnecessary. When the liquid has become perfectly clear, an aliquot portion of it is filtered off, and the excess of iodine determined by standard sodium thiosulphate. From these data is obtained the quantity of iodine consumed. This quantity of iodine, multiplied by the "ratio of alkaloid to one of iodine," gives the quantity of alkaloid sought. If preferred, but generally with less convenience to the chemist, the number of Cc. of decinormal solution of iodine consumed may be multiplied by the "alkaloidal factor of 1 Cc. $\frac{N}{10}$ I sol."

VERIFICATION OF THE IODINE FACTORS BY VOLUMETRIC CONTROL.

For atropine: In the following estimations of the strength of atropine solutions, both the iodine solution and the sodium thiosulphate solution were strictly decinormal. Of the iodine solution twenty or twenty-five Cc. were put into a hundred Cc. measuring flask and atropine solutions of known strength run in from a burette, and the operation continued as described above. When the supernatant liquid was perfectly transparent the flask was filled up to 100 Cc. and 50 Cc. were filtered off. In these 50 Cc. the excess was determined by means of the tenth-normal thiosulphate solution, and the strength of the atropine solutions calculated by using the factor 0.0036048 for every cubic centimeter of decinormal iodine used up.

	Actual strength per cent.	Number of Cc. of the atropine solution taken.	Number of Cc. of the tenth-normal iodine used up.	Results in strength per cent.
1......	0.50	12	15.6	0.47
2......	0.40	15	14.9	0.36
3......	0.30	17	13.2	0.28
4......	0.25	12	10.0	0.28

For strychnine: To test the correctness of the ratio of 1 of free iodine to 0.4390 of strychnine, two solutions were prepared, one of 1 per cent., the other of 0.612 per cent. of the alkaloid. The estimations, by the volumetric method, gave the results as follows:

	Actual strength.	Cc. of strych. sol. taken.	Iodine consumed.	Results obtained.
1....	1 per cent.	3	0.07	1.026 per cent.
2....	0.612 per cent.	7	0.101	0.633 per cent.

For brucine: Two solutions of the alkaloid were made, and estimated volumetrically, calculating by the ratio 1 part of iodine to 0.5179 part of brucine, anhydrous, with these results:

	Actual strength.	Cc. of brucine sol. taken.	Iodine consumed	Results obtained.
1....	1 per cent.	10 Cc.	0.193	0.999 per cent.
2....	0.5 per cent.	10 Cc.	0.096	0.497 per cent.

For morphine: Three standard solutions were made of strengths in anhydrous alkaloid as below tabulated. This was done by weighing a good article of well crystallized free morphine alkaloid, as $C_{17}H_{19}NO_3.H_2O$. The results were calculated by the ratio, 1 of iodine to 0.74918 of morphine, absolute.

	Strength in per cent.	Cc. of mor. sol.	Cc. of I sol.	Iodine consumed.	Result in per cent.
1......	0.518	10	20	0.070116	0.525
2......	0.259	10	20	0.034272	0.257
3......	0.100	10	20	0.014020	0.105

IODINE FACTORS OF THE ALKALOIDS SO FAR DETERMINED.

	Higher periodide formed.	Ratio of alkaloid to 1 of iodine.	Alkaloid factor of 1 Cc. $\frac{N}{10}$ I sol.
Atropine....	$C_{17}H_{23}NO_3.HI.I_8$	0.2849	0.0036048
Strychnine ..	$C_{21}H_{22}N_2O_2.HI.I_6$	0.4390	0.00555467
Brucine.....	$C_{23}H_{26}N_2O_4.HI.I_6$	0.5179	0.00655299
Morphine ...	$C_{17}H_{19}NO_3.HI.I_3$	0.74918	0.00947937
Aconitine....	$C_{33}H_{45}NO_{12}.HI.I_6$		

By Gomberg, in 1896 :*

Caffeine	$C_8H_{10}N_4O_2.HI.I_4$	0.3834	0.00485

APPLICATION IN ASSAY OF CRUDE DRUGS.

We have made estimations of total alkaloids in nux vomica, and in belladonna, by the periodide volumetric method, after extraction of the alkaloid in several ways, and have obtained satisfactory results. We have work in hand by which we hope to reach more expeditious methods of extraction. Among the menstrua under experimentation, are a saturated solution of gaseous ammonia in ether, a chloroformic solution of ammonia † and similar agents.

A VOLUMETRIC ASSAY OF OPIUM.

The morphine estimated as periodide, after successive treatment with benzene, amyl alcohol or acetone, and lime water.

This method proceeds upon the following plan : The opium alkaloids are set free by action of ammonia with certain solvents. The free narcotine, papaverine, codeine and thebaine are then removed by percolation with benzene, after which the morphine is taken out by percolation with acetone,‡ in which the morphine is sufficiently soluble. The acetone is then evaporated off, and the residue taken up with lime water which completely dissolves and purifies the morphine. It remains to filter the lime solution, acidulate it with hydrochloric acid, and estimate the morphine as periodide by titration as already detailed in this paper.

In the percolation of the opium with different solvents to separate the morphine, we depend upon two things, (1) the preparing of the opium powder by digestion with the ammonia and the solvents and then drying, and (2) an admixture with dried common salt in transferring to the percolator.

The Materials for the Assay.—Opium in fine powder (No. 60 or finer) one gramme ; stronger ammonia water ; alcohol, ether, chloroform, pure benzene (crystallized) ; acetone, boiling between 54° and 58° C., about

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* J. Am. Chem. Soc., *18*, 339.

† Suggested by Siedler and Thoms, Ber. deutsch. pharm. Ges., 1898, p. 28.

‡ Instead of acetone there may be used pure amyl alcohol, boiling between 128° and 132° C., and leaving no residue upon evaporation below the boiling point.

200 Cc.; some good lime water; ordinary common table salt, about 20 grammes; some diluted hydrochloric acid (U. S. P.); decinormal solution of iodine with potassium iodide (Wagner's reagent), and sodium thiosulphate solution standardized with the solution of iodine.

Directions for the Assay.—Of the opium in fine powder one gramme is weighed into a small mortar or deep dish, such as can be well covered with admission of a small pestle.* A mixture is made of 5 Cc. of stronger ammonia water, 5 Cc. of alcohol, 20 Cc. of ether, and 10 Cc. of chloroform. The opium is rubbed up with 2 or 3 Cc. of this mixture, to make a uniform paste, using a pestle that can be left in the dish when it is covered. The covered dish is now put aside for about three hours, from time to time moving the dish gently; of well dried and finely powdered common salt about 15 grams are now added and carefully mixed into the mass. Then the dish is left open in a warm place of 30° to 35°C. for two or three hours, when it is placed in a desiccator containing sulphuric acid and a dish of paraffin, a vacuum desiccator being preferable, until the mixture is perfectly dry, as shown by the looseness of the powder under the motion of the pestle. If left over night it is sufficient. The entire contents of the dish are now transferred to a little glass percolator of about 1.3 centimeters (½ in.) inner diameter, and 22 centimeters (9 inches) length,† rubbing out the dish twice with a little more of the dried common salt. The mass is now percolated with the benzene until the percolator is colorless, and until upon evaporating one or two drops of the percolate in a watch-glass, taking up the residue with four or five drops of acidulated water and adding a drop or two of Wagner's reagent, no turbidity appears (removal of alkaloids other than morphine). A shallow dish is now set under the percolator, and pure acetone used to continue the percolation to complete exhaustion, as found by evaporating ten drops of the percolate on a watch-glass, taking up the residue with two or three drops of acidulated water, and adding a drop or two of Wagner's reagent, when no turbidity at all should appear. Usually as much as 200 Cc. of acetone are required. The acetone is now evaporated, at a temperature not exceeding 45°C., to complete dryness. The residue when cool is rubbed up with good fresh lime water, the solution poured without filtering into a graduated stoppered cylinder of 100 Cc., the dish washed four or five times with portions of lime water, to fully clean the dish, when lime water is added to make the volume 100 Cc. The cylinder is now securely stoppered and well shaken for half an hour. Of the mixture enough is now filtered into another graduated cylinder, with glass stopper, to make up a filtrate exactly fifty Cc. To this liquid is added dilute hydrochloric acid (U. S. P.) to just perceptible acidulation, and the tenth-normal iodine solution is slowly run in from the burette while gently shaking the cylinder until precisely 25 Cc. have been added. Water is added to any convenient mark of the cylinder, which is then stoppered securely and shaken vigorously and continuously for about twenty minutes, until, on standing a minute or two, the supernatant liquid, of a pronounced iodine-red color * is perfectly clear and transparent. The liquid is now filtered off so as to take just one-half the volume of the filtrate. In this half of the liquid the excess of iodine is titrated back with the tenth-normal sodium thiosulphate solution, using starch as an indicator. The number of Cc. of the thiosulphate solution multiplied by two is subtracted from twenty-five, the number of Cc. of iodine solution used. The remainder is now multiplied by the factor 1.89586 (0.0094793 × 2 × 100), the product being the percentage of morphine in the powdered opium as weighed.

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* A screw-top ointment jar of mortar-shaped bottom and four or six ounces capacity serves very well.

† The tube of a one-ounce syringe does very well.

The precautions most essential are, (1) that the opium residue before percolation be thoroughly dried; (2) that the acetone should not contain anything distilling below 54° C., or above 58° C.; (3) that after the added excess of iodine the container be continuously shaken until the precipitate is so fully separated that the solution above it is clear. An automatic shaker is an aid in this assay. A second estimation can be made with the remaining part of the lime solution.

Without the use of lime water in purification of the morphine of the residue, we find the color of the resulting acidulous solution to be inconvenient in the titration, and find the percentage figure to be uniformly higher than when obtained after lime solution. The vessel is easily cleaned from adhering morphine periodide by the use of acetone.

RESULTS OF THE OPIUM ASSAY BY THE PERIODIDE METHOD.

We can give here the results of assay of but three samples of powdered opium, these coming from three different reputable houses. They were all marked; sample A to contain 14 per cent., samples B and C to contain the quantity required by the United States Pharmacopœia. Three analyses of each sample were made, and to sample A the United States Pharmacopœia assay method was also applied, and it was found to contain 14.4 per cent. morphine, by that method. The volumetric method was carried out exactly as described above.

SAMPLE A.

	Opium taken in grammes.	Iodine consumed by one-half.	Percentage morph. found.
1	1.0036	0.116644	17.41
2	1.008	0.116732	17.37
3	1.0022	0.116642	17.44

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* If the liquid does not have this red color, it must be because of a lack of the indispensable excess of the iodine, of which an additional quantity should be added.

SAMPLE B.

	Opium taken in grammes.	Iodine consumed by one-half.	Percentage morph. found.
1.............	1.0033	0.088721	13.25
2.............	1.0023	0.088720	13.20
3.............	1.0026	0.088720	13.21

SAMPLE C.

	Opium taken in grammes.	Iodine consumed.	Percentage. morph. found.
1...............	0.9969	0.096319	14.48
2...............	1.0016	0.097219	14.55
3...............	0.9988	0.094552	14.19

AS A VALUATION OF THE MORPHINE OF ANY PHARMACOPŒIAL ASSAY.

If it should be desired to estimate the alkaloid in the crystals obtained in assay by the Pharmacopœia of this or any other country, the periodide volumetric analysis could be well applied, as follows:

Let the crude morphine obtained by the pharmacopœial method be taken up with lime water, the latter made up to a given volume, and a measured portion of the filtered solution placed in a graduated vessel and accidulated with hydrochloric acid; let a definite excess of the decinormal iodine be added, in small portions at a time, and shaken after each addition, till the periodide separates out and the clear liquid retains a dark red color. Making up the mixture to a given volume, filtering off half, and then titrating the excess of iodine in this half by standard sodium thisulphate, the amount of iodine consumed can easily be found. Working on ten grammes opium, a tenth portion of the lime water solution would represent one gramme of opium, and the percentage of morphine would be equal to the weight of iodine consumed, multiplied by 74.918, or to the number of Cc. of the tenth-normal iodine consumed multiplied by 0.94793. Several analyses could be made with the remaining part of the lime water solution.

University of Michigan, July, 1898.

SUGGESTED PROCESS FOR DEODORIZED TINCTURE OF OPIUM.

E. L. PATCH.*

At the Montreal meeting I was requested to report upon this process, which was stated to be as follows:

Granulated Opium	100 Gm.
Benzinum U. S. P..	400 Cc.

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* The acceptance of this subject by Prof. Patch for investigation was the result of correspondence between him and the Special Committee of Research, and therefore he presents his report through this Committee. The subject, however, was previously proposed by the Committee on Revision of the Pharmacopœia in this Association (Proceedings for 1896, vol. 44, p. 127).—*A. B. Prescott.*

Macerate 24 hours and decant. Macerate residue with 200 Cc. of benzine for 24 hours, decant upon a filter, wash the filter with 200 Cc. of benzine and dry the opium at a gentle heat. Macerate the opium in 300 Cc. of warm water for 24 hours, transfer to a percolator, wash with warm water to 800 Cc., add 200 Cc. of alcohol, filter and assay.

The supposed advantages of the process consist in the use of benzine in place of the more costly ether for the removal of narcotine, etc., and the employment of a granulated opium in place of the fine powder. The official process allows 200 Cc. of ether for washing 100 Gm. of opium. The suggested process allows 800 Cc. of benzine.

The relative solubilities of morphine and narcotine in various solvents, are stated to be as follows:

	Morphine.	Narcotine.
Cold water	1 in 33,000	1 in 25,000
Boiling water	1 " 500	1 " 7,000
Cold alcohol	1 " 40	1 " 80
Boiling alcohol	1 " 30	1 " 20
Amyl alcohol	1 " 400	1 " 300
Chloroform, U. S. P.	1 " 175	1 " 3
Ether	Scarcely soluble.	1 " 166
Benzole	" "	1 " 22
Benzine	" "	Scarcely soluble.

Different observers do not agree upon the solubility of these bodies, which appears to be largely influenced by physical condition, while the stated solubilities are those of pure alkaloids and not of the combinations existing in the drug.

The morphine existing in the drug as meconate, a salt quite readily soluble in water and alcohol, may be more soluble in other solvents than is generally understood. The narcotine existing in a free condition, has nearly the same range of solubilities as given for the pure alkaloid. In exhausting the opium with water a large proportion of the narcotine is supposed to be rejected. In exhausting first with ether, a hundred grams of opium, containing six grams of narcotine, would theoretically require about 1000 Gm. of ether, or ten times its weight, and an indefinite quantity of benzine.

BENZINUM.

The benzine of the Pharmacopœia is defined as a transparent, colorless, *odorous* liquid, of sp. gr. from 0.670 to 0.675, and boiling point of 50° to 60° C. It should evaporate without residue.

SAMPLE NO. I.

Purchased as benzine. Had a sp. gr. @ 15° C. of 0.6914.

1000 Cc. yielded 30 Cc. of distillate below 50° C.
" " " 165 Cc. between 50° C. and 60° C.
" " " 195 Cc. " 60° C. and 73° C.
" 610 Cc. above 73° C.

SAMPLE NO. 2.

Purchased as gasoline. Had a sp. gr. of 0.6886 @ 15° C.
1000 C.c. yielded 95 Cc. of distillate below 50° C.
" " " 190 Cc. of " between 50° C. and 60° C.
" " " 375 Cc. of " " 60° C. and 73° C.
" " " 340 Cc. of " above 73° C.

SAMPLE NO. 3.

Purchased as gasoline. Had a sp. gr. of 0.650 @ 15° C.
1000 C.c. yielded 750 Cc. of distillate below 50° C.
" " " 140 Cc. of " between 50° C. and 60° C.
" " " 60 Cc. of " " 60° C. and 73° C.
" " " 50 Cc. of " above 73° C.

The mixed fractions boiling below 60° C. formed a mixture, having a sp. gr. of 0.6450 @ 15° C., and this was employed in the process.

EXPERIMENT NO. 1.

500 Gm. of No. 40 opium, assaying 16.1 per cent. morphine, was treated exactly as suggested in proposed process. The benzine washed opium was dried in a drying closet at 55° C. for three days, then made into 5000 Cc. of deodorized tincture, a sample of which is submitted as No. 6.

It assayed but 1.334 per cent. morphine. The ether washings from 100 Cc. used in assay gave a residue of 0.720, yielding an abundance of narcotine. The finished product has an odor of gasoline. It is evident that more benzine must be used, that it is very difficult to get rid of the odor, and that instead of instructing to percolate 100 Gm. to 800 Cc., the directions should be to percolate to *exhaustion*, evaporate to 800 Cc., and add 200 Cc. of alcohol. It is difficult to decant the benzine without carrying through the filter some portion of the opium in suspension, as noted in the accompanying sample of benzine washings.

EXPERIMENT NO. 2.

100 Gm. of No. 40 opium, assaying 16 per cent. morphine, was macerated with frequent shaking for 24 hours in 700 Cc. of benzine, the benzine decanted, the residue macerated 12 hours with 350 Cc. of benzine, the benzine decanted, the residue washed upon a filter with 350 Cc. of benzine, and the opium dried several hours at 70° C. The residual opium weighed 91 Gm. If there had been no loss of morphine in the process, it should have assayed 17.58 per cent. by the equation

91 Gm. : 100 Gm. : : 16 per cent. : 17.58 per cent.

It did assay 16.54 per cent., showing an appreciable loss. The benzine washings evaporated gave 8.17 Gm. of residue, containing crystals of narcotine. This benzine residue washed with water, and the water washings evaporated, gave 0.280 Gm. of residue free from morphine. The benzine residue washed with water, acidulated with 2 per cent. of sulphuric acid, the washings neutralized with ammonia and extracted with ether chloroform, 0.180 Gm. of alkaloid was obtained, which gave reactions for narcotine.

A sample of this benzine washed No. 40 opium is submitted, marked and numbered No. 3. Made to deodorized tincture, standardized at 1.3 per cent., it has a foreign odor, and is not satisfactory. See sample of deodorized tincture No. 3.

EXPERIMENT NO. 3.

A quantity of natural opium assaying 12.8 per cent. was cut into very thin slices and extracted with twenty times its weight of cold water, used in successive portions in an agitator. The cold water solution was evaporated to syrupy consistence and shaken with a large excess of benzine. It emulsified badly and was separated only after the expenditure of much time and patience. After separation, the benzine was expelled from the residue by continuous heat with stirring, upon a steam bath. The residual extract was 56 per cent. of the weight of the original opium. If no loss had occurred, it should have assayed 22.85 per cent. It did assay 18.47 per cent. A sample of this extract is submitted with a sample of deodorized tincture marked and numbered No. 7.

It is known that the opium is more readily extracted with warm water, but more coloring matter and odorous principle pass into solution by use of heat. To compare the use of other solvents further experiments were conducted, as follows:

EXPERIMENT NO. 4.

100 Gm. of No. 40 opium, 16 per cent., washed with 1400 Cc. of ether, as in experiment No. 2. The ether-washed opium weighed 80.5 Gm. If there had been no loss, it should have assayed 19.87 per cent. of morphine. It did assay 18.12 per cent. Samples of this ether-washed opium and of deodorized tincture made from it are submitted, marked No. 1.

EXPERIMENT NO. 5.

100 Gm. of No. 80 opium, 16 per cent., treated as above, gave 78 Gm. of residual opium, assaying 19.14 per cent. in place of 20.51 per cent., that it should assay if there had been no loss.

EXPERIMENT NO. 6.

A quantity of natural opium assaying 12.8 per cent. morphine, extracted with cold water, the washings evaporated to very soft extract, the extract redissolved in ten times its weight of distilled water, filtered from precipitated matter, concentrated to syrupy consistence, washed with ether until 10 Cc. of ether washings evaporated in a porcelain capsule gave only a slight residue, the opium solution evaporated to an extract, the extract weighed 53 per cent. of the original opium, and assayed 20 per cent. morphine in place of 24.15 per cent., that it should assay if no loss had occurred in the exhausting, heating, precipitating, etc. This extract is very clean, entirely soluble in a mixture of water four volumes and alcohol one volume, and yields a very superior deodorized tincture. A sample of the extract, one of the extract reduced to 14 per cent. with milk sugar, and of the deodorized tincture made from the extract, are submitted. It is evident that the 200 Cc. of the ether used for washing 100 Gm. of opium in the official process for deoderized tincture is insufficient. There is no uniformity in quantity required on account of difference in character of the opium employed. Sample of deodorized tincture marked B has had three ether washings, and sample C the same number, while sample D has had six. Comparison of these samples will show their variation in character.

It would be better if the U. S. P. directed repeated ether washings in its process for deodorized tincture, or washing until slight residue is obtained on evaporation of 10 Cc. of ether washing, if any uniformity in product is intended. To ascertain if loss in these processes came from imperfect exhaustion in using gum opium, 25 pounds of natural opium, assaying 13 per cent., was washed with two successive portions of lukewarm water, each portion four times the weight of the opium used. Assay showed 1.7 pounds loss. Further washing with three additioual washings gave 0.8 pounds as loss. Duplicate experiments gave very similar results.

EXPERIMENT NO. 7.

100 Gm. of No. 40 opium, assaying 16 per cent., was extracted with redistilled acetone of sp. gr. 0.8172 at 15° C., as in Experiment No. 2. The residual opium weighed 74 Gm. and assayed 19.34 per cent. morphine in place of 21.62 per cent. that it would have assayed if there had been no loss. The residue retained the acetone odor after long heating at 70° C. and subsequent exposure to the air. The deodorized tincture made from it retains the acetone odor. Samples of the acetone washings, of the acetone-washed opium No, 4 and of deodorized tincture made from it are submitted.

EXPERIMENT NO. 8.

100 Gm. of No. 40 opium, assaying 16 per cent., washed with methyl acetate, freshly redistilled, of sp. gr. 0.9268 at 15° C., gave 77.5 Gm. of residue assaying 19.6 per cent. instead of the 20.64 per cent. it would have assayed if no loss had occurred. The methyl acetate odor persistently adhered to the residue, and after several months' standing is apparent in the deodorized tincture made from it. Samples of the methyl acetate washings, the residual opium and deodorized tincture made from it are submitted, marked and numbered 5. The various morphine residues obtained in the assays are submitted for comparison.

"A."

The ether washings from 100 Gm. of No. 40 opium, Experiment No. 4, evaporated to dryness, the residue extracted with water and submitted to morphine assay, gave 0.0155 Gm.

The water washed residue washed with 2 per cent. sulphuric acid, the acid washings neutralized with ammonia and washed out with ether-chloroform, gave 4.425 Gm. of alkaloids testing for narcotine.

"B."

The ether washings from 100 Gm. of No. 80 opium, Experiment No. 5, treated in the same way as "A," gave 0.0145 Gm. of morphine and 4.435 Gm. of alkaloids (narcotine, etc.).

"C."

The acetone washings from 100 Gm. of No. 40 opium, Experiment No. 7, treated in the same way as "A," gave 0.580 Gm. of morphine and 4.860 Gm. of alkaloids (narcotine, etc.).

"D."

The methyl acetate washings from 100 Gm. of No. 40 opium, Experiment No. 8, treated in the same way as "A," gave 0.080 morphine and 5.160 of alkaloids (narcotine, etc.).

COMPARISON.

Lots of 100 Gm. of No. 40 opium, assaying 16.1 per cent. morphine, washed respectively with 1400 Cc. of benzinum, ether, acetone and methyl acetate, gave the following results:

	Benzine.	Ether.	Acetone.	Methyl Acetate.
Weight of extracted and dried opium.	91.00	80.500	74.	77.50
Weight of morphine in dried opium.	15.05	14.580	14.310	15.19
Weight of morphine in washings ...	none.	.015	.580	.08
Weight of narcotine, etc., in washings.	.18	4.425	4.860	5.16

CONCLUSION.

Benzinum, or petroleum ether, is not adapted for use in washing narcotine, etc., from opium in making deodorized tincture, on account of its uncertain character, its low range of solvent power and its disagreeable odor. Methyl acetate or acetone are much better because of greater uniformity and greater solvent power, but are inferior to ether because of their disagreeable odor.

TABLE OF SPECIFIC GRAVITIES (APPARENT) OF SOLUTIONS OF CITRIC ACID CRYSTALS, AT 15° C. WATER AT 15° C. STANDARD.

BY A. B. LYONS.

Per Cent. Citric Acid.	Apparent Specific Gravity.	Per Cent. Citric Acid.	Apparent Specific Gravity.	Per Cent. Citric Acid.	Apparent Specific Gravity.
1	1.0041	21	1.0857	41	1.1770
2	1.0082	22	1.0900	42	1.1819
3	1.0122	23	1.0943	43	1.1868
4	1.0162	24	1.0987	44	1.1917
5	1.0202	25	1.1031	45	1.1967
6	1.0241	26	1.1075	46	1.2017
7	1.0280	27	1.1119	47	1.2068
8	1.0319	28	1.1164	48	1.2119
9	1.0358	29	1.1209	49	1.2170
10	1.0398	30	1.1254	50	1.2221
11	1.0438	31	1.1299	51	1.2273
12	1.0479	32	1.1345	52	1.2325
13	1.0520	33	1.1391	53	1.2378
14	1.0561	34	1.1438	54	1.2421
15	1.0603	35	1.1485	55	1.2483
16	1.0645	36	1.1533	56	1.2537
17	1.0687	37	1.1580	57	1.2591
18	1.0729	38	1.1627	58	1.2645
19	1.0771	39	1.1674	59	1.2699
20	1.0814	40	1.1722	60	1.2753

TABLE OF SPECIFIC GRAVITIES (APPARENT) OF SOLUTIONS OF CITRIC ACID ANHYDROUS, AT 15° C. WATER AT 15° C. STANDARD.

Per Cent. Citric Acid Anhydrous.	Apparent Specific Gravity.	Per Cent. Citric Acid Anhydrous.	Apparent Specific Gravity.	Per Cent. Citric Acid Anhydrous.	Apparent Specific Gravity.
1	1.0045	20	1.0895	38	1.1799
2	1.0089	21	1.0942	39	1.1852
3	1.0134	22	1.0990	40	1.1906
4	1.0178	23	1.1038	41	1.1960
5	1.0222	24	1.1086	42	1.2015
6	1.0263	25	1.1135	43	1.2070
7	1.0306	26	1.1184	44	1.1226
8	1.0349	27	1.1233	45	1.2182
9	1.0392	28	1.1283	46	1.2239
10	1.0436	29	1.1333	47	1.2296
11	1.0481	30	1.1383	48	1.2353
12	1.0526	31	1.1434	49	1.2410
13	1.0571	32	1.1485	50	1.2468
14	1.0617	33	1.1536	51	1.2526
15	1.0663	34	1.1588	52	1.2585
16	1.0709	35	1.1640	53	1.2644
17	1.0755	36	1.1693	54	1.2703
18	1.0801	37	1.1746	55	1.2762
19	1.0848				

The specific gravity of the crystals themselves weighed in air is 1.539, water at 15° C. being taken as standard. This corresponds with a true specific gravity in vacuo of 1.537, water at 4° C. being the standard. The U. S. Dispensatory is in error in stating the specific gravity to be 1.6.

NOTE.—It is to be understood that these tables are not of scientific, but only of practical value. The citric acid was commercially pure, and only uneffloresced crystals were used for the solutions. Ordinary care was exercised in preparing the solutions and in determining the specific gravities, but the writer does not vouch for the strict purity of the acid. Acidimetric tests, however, correspond with the assumption that it was a reasonably pure article, and it answered, of course, to ordinary tests.

DECOMPOSITION OF IODOFORM BY LIGHT.

BY EDWARD KREMERS AND E. C. W. KOSKE.

In the September, 1897, number of the Repertoire de Pharmacie there appeared an abstract of a paper by G. Fleury on the Decomposition of Iodoform by Light. The original article appeared in the Journal de Pharmacie et de Chimie [6], vol. 6, p. 97, of which a copy was kindly placed at the disposal of the writers by Prof. A. B. Prescott, Chairman of the Special Committee on Research of the American Pharmaceutical Association.

The author calls attention to the fact that the notions entertained in regard to the action of light on iodoform are very indefinite. It is generally supposed that the decomposition is very limited. By an experiment, the author claims to prove that this supposition under certain conditions is correct. If, for example, a solution of iodoform in a mixture of alcohol and ether is exposed to direct or indirect sunlight, the iodoform is partly decomposed, and the decomposition stops when the liquid is colored strongly reddish-brown. This limitation of the decomposing action of light is regarded as very likely due to the fact that the violet and ultraviolet rays of the sun's light, which evidently produce the decomposition, are arrested at the surface of the colored, partly decomposed solution.

In order to prove this, the author dissolves a gram of iodoform in a mixture of alcohol and ether, and adds to this solution an excess of powdered silver. He exposes the mixture to sunlight and agitates frequently. The liberated iodine combines with the silver, and after several days the end of the reaction is indicated by the absence of color.

Upon analysis it is found that all of the iodin originally combined with the iodoform is combined with the silver to form silver iodide. The conclusion arrived at is that if the sun's light acts on the iodoform solution, decomposing the iodoform with the liberation of free iodin, after the liberation of a certain amount of iodin no further decomposition takes place, because the reddish-brown color of the solution prevents the penetration of those rays of the sun's light which affect the decomposition of the iodoform. Remove this free iodin and the decomposition will continue to the end, as shown by the above experiment.

Whereas there seemed no special reason at first to doubt the conclusions arrived at by the French chemist, the logic of this argument was by no means convincing. Aside from the possibility that sufficient iodoform might be at or near the surface of the liquid to be decomposed by the active rays of the sunlight, one other factor must be considered, viz.: that there is a possibility by no means excluded that the powdered silver may in itself have a decomposing action on iodoform.

In order to prove the correctness of the first part of M. Fleury's conclusion, a modification of his experiment seemed desirable. In fact it seems strange that this modification, as the simplest and best possible proof, should not have suggested itself at once. The modification consists not in acting upon the iodoform solution by a chemical agent, but in excluding those rays of the sun's light that are absorbed by iodin solution.

This is readily accomplished by placing a cylinder containing iodoform solution into a larger cylinder filled with aqueous solution of iodin and potassium iodide.

A preliminary experiment was made by exposing a 5 p. c. solution of iodoform in small specimen tubes to the action of sunlight. One tube was exposed to direct, the other to the indirect action of light by placing it in a bottle that admitted of surrounding it with a layer of Lugol's Solution of about 1 Cm. in thickness.

The first exposure lasted 30 minutes. The solution exposed directly was of a dark brown color, whereas the solution surrounded by the Lugol's Solution had changed but slightly in color, retaining the yellowish color of the original iodoform solution. Of the dark solution 10 Cc. required 0.85 Cc. $\frac{N}{10}$ Sodium Thiosulphate V. S., the equivalent of 0.010755 grammes of iodin. Inasmuch as the 0.5 grammes of iodoform contained in the 10 Cc. of 5 p. c. solution contain 0.48 grammes iodin, the iodin liberated by the action of the direct sunlight after 30 minutes was 2.2 per cent. of the total iodin originally contained in solution as iodoform. Of the solution that was indirectly exposed, 10 Cc. required but 0.15 Cc. of $\frac{N}{10}$ Sodium Thiosulphate V. S. for complete decoloration of the trace of liberated iodin, corresponding to 0.39 per cent. of the total iodin originally contained in the solution as iodoform.

A second exposure of another quantity of the same solution was made for one hour. The one exposed directly had a dark brown color, the one indirectly exposed retaining nearly the original color; both, however, were darker in color than in the solution from the preceding experiment. Of the dark solution 10 Cc. required 1.35 Cc. $\frac{N}{10}$ Sodium Thiosulphate V. S., the equivalent of 0.01708 grams of iodin, or 3.5 per cent.

Of the solution that was indirectly exposed, 10 Cc. required but 0.22 Cc. of $\frac{N}{10}$ Sodium Thiosulphate V. S. for complete decoloration of the liberated iodin, corresponding to 0.00277 grams, or 0.588 per cent.

These experiments were repeated several times with the results recorded in the following table. In several of the repetitions $\frac{N}{100}$ V. S. was employed because of the small quantity of $\frac{N}{10}$ V. S. necessary for the decoloration of the liberated iodin. For the purpose of better comparison the $\frac{N}{100}$ figures are calculated for $\frac{N}{10}$ solution, but are marked with an asterisk.

No. of Exp.	Direct Exposure.					
	Time, 30 minutes.			Time, 1 hour.		
	No. Cc.	Weight in Gms.	Per cent.	No. Cc.	Weight in Gms.	Per cent.
I.	0.9	0.01138	2.37	1.4	0.0177	3.69
II.	1.01* 1.07*	0.0127 0.0135	2.65 2.8	1.4 1.42*	0.0177 0.018	3.69 3.7
III.				1.275* 1.28*	0.0161 0.0163	3.36 3.36
IV.				1.27* 1.275*	0.0161 0.0161	3.36 3.36
	Indirect Exposure.					
I.	0.175	0.0022	0.46	0.23	0.00291	0.60
II.	0.21	0.0024	0.53	0.25	0.00316	0.65
III.				0.24* 0.26*	0.00303 0.00328	0.62 0.68
IV.				0.33* 0.35*	0.00417 0.0048	0.83 0.88

It readily becomes apparent from these experiments that the solution exposed directly for 30 minutes liberated from 2.37 to 2.80 per cent. of free iodin, and when exposed directly for one hour, 3.36 to 3.69 per cent., showing that as the liquid became colored with the free iodin the decomposition was less rapid. In the solution exposed indirectly for 30 minutes, the amount of free iodin was 0.46 to 0.53 per cent., in the one exposed for one hour from 0.60 to 0.88 per cent. The total decomposition was therefore slight, but the amount of iodin liberated during the second thirty minutes was almost as great as that liberated during the first half hour.

In order to verify these conclusions, another series of experiments was made, with such modifications in the details as might assure more accurate results. Glass stoppered bottles, with a capacity of 200–250 Cc. were employed for the iodoform solution, and tall specimen jars for the solution of iodin in potassium iodide. For titration of the free iodin, centinormal solutions were used throughout.

No. of Exp.	Direct Exposure.								
	Time, 30 minutes.			Time, 1 hour.			Time, 2 hours.		
	No. Cc.	Weight in Gms.	Per cent.	No. Cc.	Weight in Gms.	Per cent.	No. Cc.	Weight in Gms.	Per cent.
I.	19.8	0.0250	2.12	27.4	0.0346	2.93	50.8	0.0642	5.45
	18.6	0.0235	1.99	26.8	0.0339	2.87	51.3	0.0649	5.50
	17.8	0.0225	1.90	27.0	0.0341	2.89	51.4	0.0651	5.51
	19.0	0.0240	2.03	30.2	0.0382	3.23	48.9	0.0618	5.24
II.	18.9	0.0240	2.03	29.9	0.0378	3.20	48.8	0.0617	5.23
	18.4	0.0232	1.97	29.6	0.0374	3.17	47.1	0.0595	5.04
III.	18.5	0.0234	1.98	30.0	0.0379	3.21	47.0	0.0594	5.03
							46.9	0.0593	5.02
							45.5	0.0575	4.87
IV.							45.4	0.0574	4.86
							46.9	0.0593	5.02
				28.6	0.0361	3.06			
V.				28.9	0.0365	3.09			
	19.0	0.0240	2.03						
VI.	18.8	0.0238	2.01						
	Indirect Exposure.								
I.	3.9	0.00493	0.417	7.5	0.00950	0.806	9.4	0.01197	1.14
	3.6	0.00454	0.386	7.4	0.00949	0.805	9.3	0.01196	1.13
II.	4.7	0·00594	0.503	6.5	0.00822	0.696	6.9	0.00873	0.738
	4.6	0.00593	0.502	6.3	0.00791	0.675	6.9	0.00873	0.738
III.	4.4	0.00556	0.471	6.2	0.00784	0.664	7.2	0.00911	0.772
	4.3	0.00555	0.470	6.3	0.00791	0.675	7.0	0.00885	0.750
IV.							4.3	0.00555	0.47
							3.9	0.00493	0.417
							3.8	0.00492	0.416
V.				3.5	0.00453	0.385			
				3.3	0.00417	0.353			

From the above table it becomes apparent that the decomposition of the solution exposed directly for one half hour varied from 1.90 to 2.12 per cent.; of the solution exposed for one hour it varied from 2.87 to 3.23 per cent.; and of the solution exposed two hours it varied from 4.86 to 5.51 per cent. The ratio of time to average decomposition therefore is $\frac{1}{2} : 1 : 2 = 2.01 : 3.05 : 5.185$. In a general way this substantiates the conclusions arrived at from the preliminary experiments. It will be desirable, however, to study the increase of decomposition resulting upon still longer exposure.

The solution exposed indirectly for one-half hour was found to contain from 0.386 to 0.503 per cent. of free iodin; that exposed for one hour from 0.353 to 0.806 per cent.; that exposed for two hours from 0.416 to 1.14 per cent. Upon examination of the details of the second half of the above table, the cause for these discrepancies will at once become apparent.

The minimum data of the one and two hour exposures result from not removing the cylinders from their mantle of iodin solution or from not opening them at shorter intervals. Omitting then these variations, the decomposition for one hour exposure is 0.664 to 0.806 per cent.: and for the two hour exposure 0.738 to 1.140 per cent. The ratio of time to average decomposition, therefore, will be ½ : 1 : 2=0.4445 : 0.735 : 0.939. In calculating these averages the two extreme percentages only were taken into consideration. Although these figures do not give the average of all the estimations, yet they may be considered sufficiently approximate for the sake of a general comparison.

The ratio of time to percentage decomposition without intermediate determinations will be ½ : 1 : 2=0.445 : 0.369 : 0.434. If the minimum datum is substituted for the average percentage in the first figure the ratio will be 0.386 : 0.369 : 0.434, which implies practical stability of the iodoform solution when surrounded by a mantle of iodin solution of at least one centimeter in diameter.

In order to get a clearer conception of this protective influence of the iodin liberated in the iodoform solution exposed directly to sunlight and also to ascertain more about the ratio of decomposition upon longer exposure further experiments were made, the results of which are given in the following table:

No. of Exp.	Direct Exposure.								
	Time, 4 hours.			Time, 6 hours.			Time, 8 hours.		
	No. Cc.	Weight in Gms.	Per cent.	No. Cc.	Weight in Gms.	Per cent.	No. Cc.	Weight in Gms.	Per. cent.
I.	51.3	0.0649	5.50	109.4	0.1384	11.73	115.1	0.1457	12.35
	50.9	0.0644	5.45	108.6	0.1373	11.63	116.6	0.1475	12.50
	51.6	0.06528	5.53	107.5	0.1360	11.53	117.2	0.1487	12.56
II.	47.4	0.0599	5.09	71.3	0.0902	7.64	117.4	0.1485	12.58
	48.6	0.0614	5.21	74.	0.0936	7.93	117.9	0.1491	12.64
	48.4	0.0612	5.20	73.8	0.0935	7.92	118.6	0.1500	12.71

In the experiments made by M. Fleury powdered silver was added to the solution of iodoform to take up the liberated iodin. Now the question may be raised whether or not the powdered silver in itself does not have a decomposing action on the iodoform solution. In order to investigate this three experiments were made.

Exp. 1. An approximately one per cent. solution of 1 gram of iodoform was made, precipitated silver was added in excess, and the mixture allowed to stand in a dark cupboard wrapped in a cloth for three days. It was found that after this time 0.730 Gm. or 80.4 per cent. of iodin of the iodoform had united with the precipitated silver to form silver iodid.

Exp. 2. This was practically a repetition of the first experiment, with the only difference that the silver was allowed to remain in contact with the iodoform solution four days instead of three. Upon weighing the silver iodid it was found that 0.735 Gm. of iodin from the iodoform had united with the silver, which is equal to 81.03 of the iodin. In this case the increase of 24 hours in time of contact effected only 1 per cenr. increase in the rate of decomposition.

Exp. 3. The above experiment was repeated once more, allowing seven days' time for contact. In this case almost all of the iodin, viz.: 0.890 or 98.1 per cent., combined with the silver.

Another series of experiments will be made, in which greater stress will be laid upon more uniform conditions, in order that the ratio of decomposition can be ascertained more accurately. As will be seen from the tables, no limit of decomposition of the iodoform solution has so far been reached. Experiments with longer direct exposure will, therefore, have to be made. The fact that precipitated silver has a capacity of removing all of the iodin from the iodoform solution in the dark would seem to disqualify also the second part of M. Fleury's argument.

Pharm. Chemical Laboratory, University of Wisconsin, August, 1898.

DO THE PRESENT METHODS OF PRESERVING INFANT FOODS INSURE THEIR PERFECT STERILITY?

BY OWEN W. KRUEGER, PH. G., M. D., KANSAS CITY, MO.

An occurrence which took place in Kansas City some time ago, first suggested to me the need of investigating the different milk foods, used for feeding infants deprived of their natural source of supply, to determine whether they were free from germs, or in other words, absolutely sterile.

The specific case brought to my notice was one in which Fairchild's Peptogenic Milk Powder was accused of having caused ptomaine poisoning of a patient, to whom it was administered by the attending physician's direction. The pharmacist who dispensed it received an abundance of unenviable newspaper notoriety, and was publicly accused of having sold an old and spoiled bottle of this preparation. The question then arose in my mind: Do these preparations ever become infected with bacteria through age, and can they be called perfectly sterile when absolutely fresh? To elucidate these facts I began my investigations, and examined both old and fresh samples of the various milk foods that are to be found on the market, with reference to the presence or absence of germs. These investigations were conducted on my own motion, and in my own private laboratory, without prejudice, with no preconceived notions for or against any particular preparation, and without fear of retaliation on the one hand or hope of reward on the other. In making these examinations I pursued the following method : Each can was thoroughly sterilized at place of opening by heating over the alcohol flame. The knife employed in opening the can was sterilized by being brought to a red heat. A loop full of the product was gathered on a previously sterilized platinum wire, and deposited in a culture tube containing nutrient agar. From the foods contained in glass jars a sample was obtained in a similar manner. Thus I was sure to avoid all contamination on my part. The tubes were placed in the incubator at a temperature of 100 degrees F., and carefully observed for some days with the following results :

I. *Dime Brand of Condensed Milk.* Both old and fresh specimens upon nutrient agar gave a growth of white colonies the size of a pin's head. Under the microscope these colonies were found to consist of small cocci, probably identical with the Sphærococcus Acidi Lactici of Marpmann, which causes the formation of lactic acid.

II. *Anglo-Swiss Condensed Milk.* Upon the surface of nutrient agar both specimens developed a thick yellowish interlaced layer, which, under the microscope, was found to consist of small thick bacilli with round ends, and probably identical with the Bacillus Liodermos of Lœffler, which cause coagulation of the casein.

III. *Eagle Brand Condensed Milk.* Both old and fresh specimens gave a growth of a whitish layer covering the entire surface of the culture media. Under the microscope, the former was found to consist of short, thick bacilli, resembling those described in test No. II, and the latter of small cocci probably identical with those found in test No I.

IV. *Horlick's Malted Milk.* On the surface of the culture media, both specimens produced a thin, whitish layer, which developed rapidly and under the microscope was found to consist of small thick bacilli probably identical with those described in test No II.

V. *Carnrick's Soluble Food.* The entire surface of the culture media of both specimens was covered with a dirty, grayish-white growth, which, under the microscope, was found to consist of very short, thick bacilli, probably identical with the Bacillus Lacti Pituitosi of Lœffler, which produces an acid reaction in the milk.

VI. *Lactopreparata.* Both specimens developed, upon nutrient agar, a yellowish-white interlaced growth, resembling, macroscopically, a culture of "Bacillus Subtilis," which, microscopically, was found to consist of short thick bacilli, resembling somewhat those described in test No. V. Beneath the lid of the can containing this food was the following printed statement : "The color of our Infant Foods will be found slightly darker than formerly, due to perfected methods of sterilization. All germ micro-organisms, so common in Infant Food, and so injurious to infants during the summer heat, have been destroyed in our foods without any change of their nutritious properties. Human milk is germless, and consequently our Lacto-Preparata in this respect resembles human milk as well as in all other respects excepting the presence of water." This statement is not borne out by my investigations.

VII. *Lacto-Cerial.* Upon the surface of the culture media a yellowish-white growth was produced by both specimens, which, under the microscope, was found to consist of short, thick bacilli with rounded ends, growing in chains, probably identical with those described in test No. II.

Specimens VIII to XIII inclusive, consisting of both old and fresh samples of Nestle's Milk Food, Pet Cream, Highland Evaporated Cream, Lactated Food, Fairchild's Peptogenic Milk Powder, and Eskay's Substitute for Mother's Milk, were found sterile.

The old specimen of "Highland Evaporated Cream" examined had stood on the grocer's shelf two years.

In the tubes where I received no growth, I repeated the operation with the same result. In those where I had obtained a growth, thinking that perhaps the method employed was not sufficiently precautionary, I made several more cultures of each food product from both old and fresh specimens and obtained, in each case, the same positive results. I, therefore, feel justified in saying that the conclusions arrived at in these investigations can be depended upon as absolutely correct.

When, in the attempt to identify these germs, I said "probably identical with," I meant to convey the idea that time would not permit me to accurately diagnose the species to which these different micro organisms belong; my object being to determine the presence or absence of germs. Thus you will see that, with six exceptions, all the food specimens I have mentioned are not sterile, but contain germs of various kinds. It, therefore, easily suggests itself that any one of these foods, when opened and exposed to the proper temperature and conditions, might become a favorable culture medium for these germs, and give rise to poisons injurious to the growing child.

Experience has shown that some infants do contract bowel trouble during the summer when fed on condensed milk, as taken from the cans, but enjoy good health when fed on the same product if resterilized. These investigations prove that the process of sterilization employed in the manufacture of certain "Milk Foods" is defective.

It is certainly unjust to criticise the pharmacist for the short-comings of a hermetically-sealed preparation, which he has never opened, and with the manufacture of which he had absolutely nothing to do.

In conclusion, I wish to say that to some present it may not seem appropriate to read an article of this character on this occasion. It is, nevertheless, of interest and importance, because the pharmacist is often accused of keeping in his store food products the age of which might easily explain such results. By proving, however, that even the *fresh* goods of this class do not come up to the claims of the manufacturers, I trust to have rendered our profession a service, and to have fully justified the presentation of this article.

BEZOARS AND BEZOARDICS.

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In one of the recent publications of the Missouri Botanical Gardens there appears an interesting article entitled "An Unusual Phyto-Bezoar," in which a description is given of the Bezoar itself and of its origin and modes of formation in the internal economy of various animals.

The article is confined to a description of one form of Bezoar, and as there is another large class of similar bodies, which at one time enjoyed enormous popularity in the treatment of almost every disease to which flesh is heir, it will perhaps not be out of place to briefly recall some of the features and uses of these interesting bodies.

The name Bezoar is applied to concretions of various kinds which are found in the stomach, intestines or bladder of various animals. There are three principal varieties:

1. Stony concretions or calculi obtained from the intestines of animals, chiefly of the sheep or deer families.
2. Round agglomerations of hair or vegetable fibre—the Phyto-Bezoar—found usually in the stomach or intestines of ruminating animals.
3. Gall stones of various kinds.

These bezoars in the 17th and 18th centuries were highly esteemed for their supposed medicinal virtues, and numerous treatises have been written extolling them for the treatment of every disease. They were classed as powerful alexipharmics, and it was supposed that no poison and no eruption nor pestilential disease could withstand their influence. Of the numerous varieties two were most highly esteemed, *Bezoar Orientale*, found in the stomach of the gazelle of India, and the *Bezoar Occidentale*, found in the stomach of the goats of the Western Hemisphere. The former was official for many years in the "London Pharmacopœia," and both were official in the "Edinburgh Pharmacopœia." Bezoar was also an ingredient in several compound powders which were at the time highly esteemed.

In a work entitled "A New English Dispensatory," by Dr. R. James, and published in 1752, considerable space was devoted to a description of the Oriental Bezoar. This was said to be obtained from the stomach of Capra Gazella, the bezoar goat of India, and the stones differed much in shape and size. The bezoar is described as follows:

"Each stone is composed of several laminæ, formed of a greenish or olive-coloured substance diversified with streaks which run through the whole body of the stone. These laminæ adhere so closely to one another that, breaking the stone, we may observe several layers of different thicknesses, and also, sometimes, of different colors. There are also found laminæ which, upon breaking the stones, disengage and separate themselves very regularly from each other. This also takes place when heat is applied. The center is usually hard, gravelly and pretty smooth. The bezoardic layers are easily broken, are composed of a somewhat glutinous substance, and when chewed tinge the saliva. The authors advise us to make choice of bezoar stones that are of moderate bulk, brownish, and which communicate a yellow color to quick-lime and a greenish one to chalk, and which cannot be dissolved in water. If the stone be pricked with a hot iron no bubbles should arise, showing that the bezoar is not adulterated with resins. The laminæ also are found and arranged in strata."

The author of the new "English Dispensatory" also states that the best species of bezoar probably do not reach the West. In Persia they enjoy great reputation, and it is said that the animals yielding the best bezoar stones feed on the mountains of that country.

In "A Compleat English Dispensatory," published by Dr. J. Quincy in 1749, the author states that the bezoars have been generally recognized as of animal origin, but a certain Dr. Slare, in a late book, has attempted to show that they are factitious. Their value, he states, is determined by the color, "preference being given to smooth stones, which give a green color to white paper rubbed with chalk." This is said by Dr. Quincy to be "a sure way of trying it." He quaintly adds that if the stones are factitious "the art must be in very few hands, or the material very scarce, to keep them up so dear." From descriptions given by contemporary writers, it appears that owing to the high prices of these stones considerable sophistication was practiced, factitious stones being manufactured out of plaster of Paris, or pipe-clay tinged with ox-gall, or from crabs' eyes and claws bruised and mixed with musk or ambergris.

Dr. James gives the following description of the medicinal virtues of the stones: "Bezoar is said to be an alexipharmic and a promoter of sweat. It is good in epilepsies, palpitation of the heart, jaundice, dysenteries, stone and obstruction of the menses. It cures melancholy and promotes delivery, and the dose is from three to twelve grains." The author says, however, that there are no instances on record to support any such claims. "It has no smell or taste, and on taking into the stomach gives no sensation nor produces the least perceptible effect," which is ground enough, says Dr. James, "to suspect it good for nothing—the test of the efficacy of a remedy in those days being its nauseousness combined with the disturbance it created when taken into the stomach. He then goes on to say that there is much difficulty in securing the genuine article, and complains of the excessive price of the drug, which "renders it inconvenient to exhibit in sufficient quantities, or long enough to determine whether it possesses the virtues attributed to it." He states that he is informed by physicians who have frequently prescribed it, that "it has no sort of mild virtues that they could perceive, which might give it preference to the testaceous powders." "I cannot," he continues, "however, forbear saying that if we had a genuine bezoar stone we would find it indeed with greater medicinal virtues than at present we believed it possessed of." Dr. J. Quincy says that the shops use it only in the "Pulvis e Chelis Compositus or Gascoign's Powder," which, "though a clear medicine, seems to be of no virtue as an alexipharmic; yet, as it has often been joined in prescription with some alexipharmic of efficacy, it has the credit among the ignorant of doing what it never had any share in."

The use of the bezoar as a remedy is said by contemporary writers to have been introduced by the Arabians. In "The Improved English Dispensatory," published in 1753, which curiously enough has no name on the title-page, it is stated that the remedy was unknown to the Greeks. The candor with which physicians of those days gave away professional secrets is noticeable in almost all the medical works of the period. For example, in the book just mentioned, the author states that the bezoar is a valuable remedy when given in doses of not less than one-half to one dram, but that owing to its great price the general dose was a few grains.

The Occidental bezoar was obtained from the stomach of the *cervus minor*, and went by the name of Americanus bezoarticus. This stone was distinguished by its paler color, rough surface, and by being heavier, more brittle, and of looser texture. Its size was also larger, the oriental being about the size of a walnut, and the occidental often as large as a goose's egg, which latter may be taken to show that even in the eighteenth century the superior greatness of things American was recognized if not fully appreciated.

In addition to these two varieties, bezoars were also classed according to the animal from which they were derived. Thus we read of the bezoars of the ox, horse, Indian porcupine, chamois, and other animals, all of which were more or less prized as a remedy for various ills. The bezoardicum humanum, now termed the common ordinary calculus, was also much esteemed as an alexipharmic.

From the oriental bezoar two preparations were made which were in high repute among the general public. These were the "Pulvis Bezoardicus" and the "Pulvis E Chelis Cancrorum Compositus." They were prepared as follows:

PULVIS BEZOARDICUS.

Take of—

Compound powder of crab claws	1 lb.
Oriental bezoar	1 oz.

Make into a powder.

This was official in later editions of the London Pharmacopœia. Dr.

James, in his "New English Dispensatory," quoted above, says that the powder is useless, and relies for support only on fashion, but "it is of some service," he says, "to compounders, because when used, it is generally repeated every three or four hours." Raleigh's cordial, which succeeded this, serves, says Dr. James, "the end of the compounder better, but I am afraid is not so innocent to the patient."

PULVIS E CHELIS CANCRORUM COMPOSITUS.

(*Compound Powder of Crabs' Claws, or Gascoign's Powder.*)

Take of prepared pearls, of crabs' eyes, red coral, the whitest amber, calcined hartshorn and oriental bezoar, of each one ounce; of the powder from the black part of crabs' claws, the weight of all the other, and make them into a fine powder, which is to be formed into balls with a solution of gum arabic.

In former dispensatories the powder was massed with a jelly made from vipers' skins. In the "Improved English Dispensatory" a dissertation on the effects of this powder follows, in the course of which it is stated that bezoar is much adulterated, and directions are given for recognizing substitutes. The author concludes by saying, "It is very remarkable that this celebrated and dear powder has been very exactly counterfeited by two extremely cheap and common ingredients, namely, tobacco pipes and animal gall artificially prepared and mixed together; and, doubtless, this kind will be found in those shops which buy their Gascoign's powder ready made." The advocates of home-made pharmaceuticals were evidently as numerous then as now.

The success of the bezoars as remedies led to the general application of the term to any medicine supposed to possess the same properties as the bezoar, as the antidotes, cordials, alexiteria or alexipharmics. Such remedies were known as Bezoardics, of which a number were official in the London and Edinburgh Pharmacopœias. They enjoyed for many years an enormous popularity. The chief of those were the bezoardicum joviale and the bezoardica minerale et animale. The dispensatories give the following directions for their preparation:

BEZOAR ANIMALE.

There were two forms of this bezoar, both of which were at one time official in the London Pharmacopœia. The older animal bezoar was made from viper's flesh, and its preparation and properties are thus described in Hartmann's "Praxis Chymiatrica," published in 1635.

Bezoar Animale: Prodest quoque viperaru alcohol, vel bezoardicum animale, quod fit, cum post excoriationem viperarum dum adhue viuunt intestinis, capite et cauda abjectis, caro reliqua vt et cor, hepar, elota primum in aqua simplici, et postea in sp. vini, exsiccatur lente in umbra vel. B. et in pulverem subtilissimum redigitur. Hujus pulveris recipe ℥ i, sal. praeparati (saepius fusi) ʒ ij. Assumitur pulvis ad quem liber cibum loco salis mensarii. Quinta essentia perlarum ad gut. 4 vel 6 quotidie adhibita phthisicis quoque summum solatium est: illos nimirum pristinae sanitati restituit, et morbum plane expellit, praesertim si guttule aliquor olei cinnamoni ipsi adjungantur. Ad pleuritidem (plura vide supra de Pleuritide) laudant nonnulli aquam illam mucosam, quae effluit ex ore equorum, quando ex puro et gelido fonte agnantur, si patienti propinetur."

This form of animal bezoar is said by Dr. Salmon in his revised edition of the Pharmacopœia Bateana, to have all the virtues of the kind described below, besides which "it is antidote against poisonings of mad dogs, serpents or other venomous beasts, French pox and leprosy, and a cure for consumptions."

The other variety of animal bezoar was prepared as follows: Hartshorn was calcined to the highest whiteness, powdered and levigated on a marble till it became an impapable powder, spirit of vitriol was added drop by drop, and the whole made up into little balls, which were afterwards dried. Some authors recommend that the ball be calcined again, but others claimed that by this process it lost some of its virtue. Dr. Bate, physician to King Charles I., in the Pharmacopœia Bateana, says that this bezoar is "an alexipharmick, sudorifick and destroyer of worms, stops the flux of the whites, quenches thirst, etc. It is a medicine for infants second to none." The dose was from four grains to a scruple.

BEZOARDICUM JOVIALE.—THE BEZOARTICK OF JUPITER OR TIN.

The jovial bezoartick, says Dr. Salmon, "is one of the best preparations that can be made of tin, for it is not only a specific against all diseases of the womb, but a famous sudorifick in all malignant, pestilential and venereal distempers where the malignity is to be cast out by sweat. The London Pharmacopœia directed its preparation thus: Take regulus of antimony three ounces, melt and add the purest tin two ounces, and make a new regulus; levigate this and add five ounces of corrosive sublimate, distil and let the butter arising from it be fixed by three repeated distillations with thrice its weight of spirit of nitre. Powder the residue and calcine it, and while hot put into spirit of wine, and afterwards dry.

This, says Dr. Bate, "is a stupendous diaphoretick, and prevails against all diseases of the womb and many other diseases of womankind. It prevails also against fevers, plague, scurvy, etc. The dose is from gr. 3 to gr. 6.

BEZOARDICUM MINERALE.—THE MINERAL BEZOAR.

This, next to the bezoar itself, was the most famous of all the bezoardics, and, with slight modification, still finds a proper place in our pharmacopœias. Dr. Salmon, in the before-mentioned work, says that the epithet "Minerale" is added "to difference it from the stone bezoar and the animal; for that the virtues of those is not only attributed to it, but it every way exceeds them in virtue and goodness, possessing many other essential properties that they have not, by reason of the solar sulphur that is in it, the efficacy whereof is not to be exhausted." What the author means by "solar sulphur" is somewhat obscure, seeing that no sulphur enters into the compound at any stage. The London Pharmacopœia gave the following directions for its preparation:

Take butter of antimony 3 ounces, pour into it, drop by drop, as much spirit of nitre, draw off, and pour it back with the addition of another ounce of the same; draw off again, and repeat this three or four times. Let the residue be powdered and calcine it for one hour in a crucible. Then edulcorate it by washing, and burn it three or four times with spirit of wine.

In making mineral bezoar special attention was paid to regulating the heat, which must not exceed the "third degree," otherwise the distillate, which was known as "Bezoartick Spirit of Nitre," would be red, and be able "not only to dissolve gold, but also to volatilize it." This spirit was, of course, aqua regia, and a high temperature would naturally cause an abundance of nitric oxide to be formed, discoloring the distillate. (It is to be noted that the various spirits are now known as acids. Thus spirit of salt is muriatic acid).

Mineral bezoar was said to be a great alexiteric or resister of poison, and was largely administered then, as now, for its diaphoretic properties. It was often sophisticated, the flores salis ammoniaci (ammonium carbonate) being substituted for it.

Dr. Salmon comments as follows on its wonderful merits. (His chemistry seems somewhat amusing to us at the present time.) "How the butter of antimony, (which was a vehement caustick from the acid spirits with which it was filled), should, by means of another acid corrosive, (such as is spirit of nitre), suffer such an exceeding change, and become one of the sweetest and mildest medicines that is; or how spirit of nitre should be able to sweeten such corrosive matter is difficult to conceive.

"This doubt receives a two-fold solution, first, that as acids and alkalies are opposites, and destroy one another, so also in the acid kingdom there are opposite acids, which have like effects, by mixing one with another, the points of one entering into the sheaths of another.

"Secondly, that as the first acid did but adhere superficially to the antimony in its butter, and adapted to the motion of the antimonial particles, which serves them as a vehicle to display their points, so being dissolved by the spirit of nitre, they jointly fix the antimony, and destroy its motive quality, and sheath themselves in the sulphurous parts thereof, whereby they lose all their corrosion." This explanation is ingenious, but hardly satisfactory to modern chemists. He then goes on to say: "For this rare medicine does potent expel by sweat and urine, but chiefly by insensible transpiration, all the hurtful and poisonous humors lurking in the bodies both of healthy and unhealthy persons, especially in all those malign and pestilential diseases where sweating is absolutely necessary.

"And I can affirm this from a five and thirty years continued experience, that whosoever makes use of it in all the aforenamed cases shall never find himself deceived or disappointed of the help (sooner or later) which he expected. I, who have for so many years try'd, can tell, more especially where malignant serosities have abounded, as in the scurvy, cachexies, scabs, itch, French pox, etc.

"Who confidently uses it, ought also to have a diet of veal and chicken broth, with scorzoner and sarsaparilla in it, and to keep their bodies soluble, by adding every third day to the broth one scruple to half a drachm of salt of Tartar of Sennertus, or otherwise with proper clysters."

Charras, a famous physician and chemist of the Seventeenth Century, prepared mineral bezoar simply from Mercurius Vitæ (now known as antimony oxide). This was similarly treated with Spirit of Nitre and evaporated to dryness.

Le Mort in his "Chymic Medico Physica" gives the following directions for preparing mineral bezoar:

"Take regulus of antimony in powder, 1 drachm; spirit of salt prepared with oil of vitriol, 3 drachms. Mix them and digest them in sand for two days, till the regulus is dissolved; decant the clear liquor (which will be as limpid as it was before the affusion) and evaporate the one-half of it away by a gentle fire, then affuse guttatim spirit of nitre and proceed as before.

This, he says, is "an egregious sudorifick and bezoardick, curing all diseases that are to be cured by sweat, and in particularly they resist plague and poison. Dose, gr. iv. to gr. xii."

Marggrave recommends the following combination for internal use: Take bezoar mineral, saffron, āā gr. viii.; salt of wormwood and carduus, āā gr. xii.; crabs' eyes and coral, prepared, āā gr. v.; laudanum opiatum, gr. 1½; confectio de hyacintho or diascordium, q. s. Mix and make a bolus."

BEZOARDICUM LUNARE.

The Lunar Bezoar or Silver Bezoardick.

This preparation was intended as an antidote to the diseases which were then supposed to have some connection with the moon—epilepsies and brain diseases. Bate says that "it is made of luna dissolved in spirit of nitre and butter of antimony, proceeding as with the jovial bezoar, and that it is a specifick in the epilepsy, convulsions, megrim, apoplexia, &c. It is anodyn and sudorifick and prevails admirably in the cure of an erysipelas. Dose, gr. vi. ad. xii."

Rolsincius, in his Art of Chymistry, objects to this preparation because, firstly, "of the ingrateful vitriolick taste, from which it cannot be freed, causing nauseating and vomiting; secondly, because of its colour appearing blackish in superficie (though inwardly in itself white), which is not to be mended." The action of light on silver salts was evidently not, at that time, recognized.

Dr. Salmon says that it is "doubtless a famous cephalick. I cured a gentlewoman of a vehement headache with it, after a vast number of medicines had been tried in vain, and when the hope of life was past. And another I cured of an epilepsy with it, by taking about sixty doses thereof in a continued course." Dr. Salmon would be a godsend to some of our present-day patent medicine proprietors, judging from his style of writing testimonials.

BEZOARDICUM MARTIALE.

The Iron Bezoar or Martial Bezoartick.

This preparation was likewise official in the London Pharmacopœia, and was made either from the crocus martis and butter of antimony, proceeding as in the case of the other bezoars, or by dissolving iron in aqua regia, adding butter of antimony, and then proceeding as before.

"It is," says Dr. Salmon, "profitable in fevers, accompanied with a diarrhœa or flux of the bowels, also in epidemick dysenteries; for by reason of the Mars, it has the power of astringing or binding, and by virtue of the Nitre, it is cooling and anodyn."

Rolsincius (Art of Chemistry) prepares it from antimonial regulus of Mars and corrosive sublimate, which makes "a more noble bezoartick than the other kind, in all hypochondriack disaffections, diseases of the bowels, and faults of the first concoction; it incides, attenuates, opens and diffuses vicious humors per diaphoresis or by sweating."

BEZOARDICUM MERCURIALE.

The Mercurial Bezoar.

"This preparation is made," says Dr. Bate (who took it from Crollius' Basilica Chymica), "by drawing forth the tincture from the glass of mercurius vitæ, with butter of antimony, and fixing it with spirit of nitre, S. A."

It is interesting to note, that while this remedy is called the mercurial bezoar, yet it contains no mercury (mercurius vitæ is simply the old alchemical name for antimony oxide). Considerable discussion arose over its properties, and the following comments of Dr. Salmon, in his revised edition of the Pharmacopœia Bateana, are interesting: "This," he says, "Hoffman will not have to participate of mercury, but to be of an antimonial nature; but let Hoffman say what he will of this, we are sure that it participates of a mercurial property; for it is the nature of the mineral to display the Beans wherever its body has been, and to leave its character behind it.

"If you join mercurius vitae with butter of antimony, and afterwards fix it with spirit of nitre, what, I pray you, will be the effects thereof?

"Is not the exceeding purging property of the same butter corrected, so that it may be given in greater dose? Diligently consider.

"By this means it is manifest, bezoardicks may be made with all metals, in which the virtuous parts of those metals conjoined with butter of antimony, by the noble menstruum of fixed nitre, are converted to excellent medicines. Likewise many other things may with these in the former manner, be described and prepared, which perhaps were not thought of by the former age."

In spite of this argument, dissatisfaction seems to have been expressed with the effects of this preparation, for in the latter formulas we find the addition of calomel to the formula.

Dr. Salmon says the medicament "is a famous sudorifick in the lues venerea, and ought to be given at night going to bed, in some proper sudorifick vehicle, the patient being immediately after it well covered, in order to sweat upon it." He recommends the following formula for its administration: "Take black cherry water ℨijſs, mixtura simplex ℥ij, syrup of citron peels ℨſs, bezoarticum mercuriale gr. vi ad ℈i, mix for one dose."

It is evident from the foregoing that the diaphoretic action of the antimony was mistaken for the salivating action of mercury, and hence the omission of mercury from the old formulas.

BEZOARDICUM SATURNI.

The Saturnine Bezoar or Bezoartick of Lead.

This preparation was originated by Crollius, who published directions for its manufacture in his Basilica Chymica. It was made by "extracting the tincture from glass of Saturn (this being made from red lead melted with quartz) with butter of antimony and fixing with spirit of nitre S. A."

A modification of this formula was suggested later by Hoffman (an investigator as prominent in his day as was his namesake at a later period), who recommended the use of metallic lead with corrosive sublimate, which were to be mixed and distilled "so as to make a saturnine butter and a cinnabar of Saturn, from which with fixed spirit of nitre make a saturnine bezoardick S. A."

The saturnine bezoar was but little used, as can be imagined from its composition. Even Dr. Salmon, who was accustomed to cure cases "when the hope of life was past" with every outrageous remedy known at that period, does not wax enthusiastic over the merits of the remedy, but contents himself with quoting Hoffman's opinion. The latter states that "it is of mighty power against the plague, pleurisy, scurvy, scabbiness and hypochondriack melancholy; and I know, by experience, it is of great use in curing all diseases which are to be cured by sweat, or proceed from corruption or putrefaction."

BEZOAR VENERIS.

The Copper Bezoar or Bezoartick of Venus.

This preparation was but little used internally, its chief use being externally in combination with some ointment. It was prepared like the other bezoardics by distilling copper and butter of antimony with spirit of nitre and proceeding in the usual manner. Internally it was administered in doses up to six grains as a preventative of leprosy, and for diseases of the head and brain.

Dr. Salmon says it is "an egregious medicament to cure the French disease, virulent gonorrhœas, eluxcerations of the veins and genital parts, with other like diseases." He recommends its administration with "some proper alexiterick, sudorifick, and given at night going to bed, causing the sick to sweat well upon it."

BEZOARDICUM SOLARE.

The Golden Bezoar.

From the fact of its containing the most noble metal, special attention was devoted to the preparation of this remedy, which was official in the London Pharmacopœia. For the solution of the metal the bezoartick spirit of nitre (which was nothing more than aqua regia) was employed, and the distillation process, the feature in the preparation of all these remedies, was repeated time and time again. The most popular method was as follows. It was devised by one Dr. Schroder: "Take butter of antimony one-half pound, cinnabar of antimony one ounce, dissolve in a long-necked glass in a gentle sand heat, till they gently boil, so the solution will be red; to this add some pints of hot water, and the white powder will precipitate; decant the yellow liquid from it by degrees, then sweeten it by washing, and dry gently. Then take leaf gold ʒij A. R. ℥ij (made of A. F. and a quarter part of common salt), then abstract the A. R. and cohobate four times.

"Then dissolve it again, and add to it of the former powder ʒiij, digest 28 days, and abstract by degrees, cohobate the third time, and increase the fire that the A. R. may fly away; then affuse S. V. and abstract it several times; so you have a bezoardick mineral of gold."

Hoffman took objection to this "by reason of the corporiety of the gold, and for that it is not rendered subtle, whereby it is less useful, and not so much augmented in vertue."

Commenting on this objection, Dr. Salmon says that Hoffman "shows a way of rendering the gold subtle, and reducing it from a corporeal to a spiritual substance, which is by a Philosophick trituration in a philosophick mortar." Salmon, however, prefers the use of a Philosophick Mill invented by a Frenchman named Langelot. It was made of well-tempered steel, and into it was placed the gold leaf cut into small pieces. This was ground "from morning till night for a month together," and was then dissolved in aqua regia and treated as before. The reason for this prolonged grinding is explained on the ground that "assisted by the heat and natural disposition of the steel, that draws it to the admirable salt of the air, which insinuating by degrees into the pores of the gold, hastens its dissolution." This may seem to us to be a roundabout way of saying that oxidation occurred; but as oxygen was not known then, the explanation is not only interesting but chemically accurate.

In all preparations of gold much stress was laid on the spiritualizing or subtilizing of the metal, and the better that operation was performed, the better would the preparation be.

Solar bezoar was an almost universal panacea, but depending for its virtues, like all other bezoardics, chiefly on the presence of antimony, it is not surprising to find it recorded as "a famous sudorifick and cordial and powerfully drains forth the sweat, and frees the heart from poysonous vapors." A combination much used at one time was the following: Take of solar bezoar ʒiſs, solution of coral ʒiſs, salts of rue and guaiacum ad ʒſs. Mix by grinding them an hour in a glass mortar, then add spirit of sulphur ʒſs, extract of saffron ʒiſs, oils of cloves, amber, cinnamon ad ℈j. Mix and digest warm in a glass for three days, and keep it for use.

"This compound provokes sweat strongly, and is good in apoplexies, palsies, gout, trembling of the joints."

Curious as these compounds may seem to the pharmacist of to-day, they were in their time as much an advance on the pharmacy of the period as the "synthetic" remedies of to-day are in advance of the crude vegetable products.

It is interesting to note that all these remedies sprang from an attempt to imitate in the laboratory the natural secretion or excretion, as the case may be, of an animal product. The use of the natural bezoar was based largely on superstition or ignorance, or possibly on the glowing reports of the value of the remedy as used in foreign lands, and it is questionable if the physicians of the period are more to be criticised than those of the present time who hold in almost superstitious veneration the modern products of pharmacological enterprise "manufactured in Germany."

In looking over the old dispensatories and pharmacopœias, it is curious to note the frank manner in which directions are sometimes given for regulating the dosage of the remedies of the period. This seemed frequently to depend on the financial status of the patient, and the poor man had, consequently, much to be thankful for in escaping the heroic doses usually administered to those who could afford to pay the necessary amount. In the case of the above-mentioned preparations he was doubly to be congratulated, for a dose of from ten to sixty grains of antimony, internally, is not to be lightly spoken of. The only wonder is that so many patients lived to testify to the merits of such treatment.

The Mineral Bezoar, under the name of antimony oxide, still finds its place in our pharmacopœias, but whereas the maximum dose in the British Pharmacopœia is but four grains, Dr. Salmon, in his treatise, gives the dose from ten to thirty grains. This is the only survival of a once almost universal method of treating diseases, but exception may be made in favor of the natural bezoar (Bezoar orientale), which is still held high in popular estimation as a remedy in many parts of the far East.

THE STANDARDIZATION OF VOLUMETRIC ACID AND ALKALI.

W. A. PUCKNER, CHICAGO.

While in chemical circles the standardization of volumetric acid and alkali has been most thoroughly discussed, the degree of accuracy and reliability of each method demonstrated by extended data, and new schemes or modifications of old ones, believed to be more available or to yield better results, are frequently proposed, so that from reference to literature the probable degree of accuracy of the method chosen may be gleaned, little has been published in pharmaceutical journals of this country.

In view of the approaching revision of the United States Pharmacopœia, the writer wishes to consider the methods best adapted to the need of the pharmacist, and to compare these with the method now recognized in the Pharmacopœia, with a view of ascertaining if any of these could with advantage replace the present one. It has been the aim of the Pharmacopœia Revision Committee to introduce analytical methods which, with little apparatus and a moderate expenditure of time and skill on the part of the operator, will yet give fairly accurate results, and due prominence will be given this principle in the discussion, although the writer, personally, does not approve of the policy.

OXALIC ACID AS THE BASIS IN ANALYSIS BY NEUTRALIZATION.

In the preparation of all volumetric acid and alkaline solutions of the United States Pharmacopœia oxalic acid is taken as the basis, normal oxalic acid solution being prepared by dissolving a weighed quantity of crystallized acid in water and making up to a definite volume, and normal hydrochloric acid and normal sulphuric acid solutions are standardized upon normal alkali, which latter is standardized upon weighed quantities of pure oxalic acid. The decinormal acid and alkaline solutions are, of course, obtained by diluting the standardized normal solutions.

It was formerly supposed that oxalic acid could readily be obtained pure, and containing a constant amount of water of crystallization, and that it was neither hygroscopic nor efflorescent, and would therefore remain of constant composition, and hence was recommended as a standard for volumetric work. Now it is known that oxalic acid, purified as directed by Mohr, who introduced it into volumetric analysis, is not pure, as is manifest from the many methods * proposed for its purification.

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* Reinschauer, Dingler's poly. Journ., 167, 47; Habedanck, Ztschf. f. analyt. Chem., 11, 282; Stolba, Ztschf. f. analyt. Chem., 13, 50; Siebold, Jahresberichte, 1875, 519.

Sutton [*] also states that an acid containing the theoretical amount of water of crystallization is difficult to obtain.

While at present oxalic acid is never depended upon when accurate results are desired, it is still a question whether the objections advanced against its use are really the cause of a material error, or if the error so introduced is so small that it may be neglected in pharmaceutical assaying, and that perhaps in view of the ease with which standard solutions may be prepared if it is safe to assume that an acid purified as directed in the Pharmacopœia corresponds to theory, its continued use should be advocated. In order to ascertain the probable error introduced when using oxalic acid as officially directed, a sample of commercial acid was divided among a number of advanced pharmacy students, with instructions to purify the same, strictly following the directions of the Pharmacopœia. The specimens so obtained were titrated by me with standard sodium hydroxid solution.

The value of the sodium hydroxid solution was based on the following data: Sodium hydroxid, practically free from carbonate, was dissolved in recently distilled water, a little barium chlorid added to remove carbonate, the solution filtered and at once transferred to small bottles. This solution was titrated upon normal sulphuric acid, factor 1.0005 (the work leading to the adoption of this value will be presented later), and normal hydrochloric acid, factor 1.0004, standardized according to the silver chlorid method as adopted by the Association of Official Agricultural Chemists.[†] Portions of 25 Cc.[‡] of the volumetric sulphuric acid, corresponding to 25.013 Cc. normal acid, measured into a beaker, neutral litmus added and titrated with the solution of sodium hydroxid, required respectively 25.5, 25.475, 25.5, 25.5, 25.425, 25.45 and 25.4 Cc., or an average of 25.46 Cc., according to which the sodium hydroxid solution has a factor of 0.9824.

Portions of 25 Cc. of the hydrochloric acid, corresponding to 25.1 Cc. of normal acid, similarly treated, required respectively 25.575, 25.575, 25.6, 25.6 and 25.575 Cc., or an average of 25.585 Cc., and according to this the sodium hydroxid has a factor of 0.981. The mean of these two factors, or 0.9817, will be accepted for the following titrations. The estimation of the oxalic acid was carried out as follows: Approximately 6 Gm. were weighed accurately, dissolved in water, and the whole brought to a volume of 100 Cc. Of this solution three portions of 25 Cc. each were neutralized with the normal sodium hydroxid just described, phenolphthalein being used as an indicator, and the average of the number of Cc. used calculated into crystallized oxalic acid.

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[*] Sutton's Volumetric Analysis, 6th Edit., p. 42.

[†] Bulletin No 46, U. S. Dept. Agriculture, p. 15.

[‡] All pipettes, burettes and measuring flasks used in this work have been tested by the German Physical Laboratory.

No. of Specimen.	Gm. of Substance in 25 Cc.	Gm. of $C_2H_2O_4\ (H_2O)_2$ found in 25 Cc.	Per cent. of Theory.
1	1.7025 Gm.	1.7020 Gm.	99.90
2	1.5098 "	1.4996 "	99.32
3	1.5120 "	1.5046 "	99.51
4	1.5311 "	1.4424 "	94.21
5	1.5209 "	1.5253 "	100.29
6	1.5091 "	1.5078 "	99 91
7	1.5214 "	1.5229 "	100.09

It is seen that three specimens (1, 6 and 7) come within 0.1 per cent. of theory, and must be considered entirely satisfactory; one (4) is nearly 6 per cent. below, and must be rejected without question, while the remaining three vary from minus 0.68 per cent. to plus 0.29 per cent. of theory, and are far from satisfactory.

While these experiments are perhaps not as elaborate as could be wished, yet they show that oxalic acid is not a safe basis for volumetric work, unless the directions for recrystallization can be changed so as to yield a more constant product, and that it is desirable to find some other way of determining the value of alkaline solution. Experiments upon the recrystallization are under way, and will be reported at a future time; the present paper discusses the applicability of some other methods proposed for this purpose. Before considering these methods attention is called to another objection to the present method of standardization. While several volumetric acid and alkaline solutions are recognized by the Pharmacopœia, but two, normal sulphuric acid and normal potassium hydroxid, find any extended application, and for all practical purposes all other solutions may be omitted in this discussion. To obtain standard normal sulphuric acid and potassium hydroxid solutions three methods may be pursued, namely, to obtain a standard potassium hydroxid solution and upon this standardize the acid, to standardize the sulphuric acid and base the alkaline solution upon this, or, finally, to ascertain the value of both the acid and alkali by methods independent of each other. While, theoretically, any one of these methods is correct, the last, on account of the greater accuracy of weights over measures, should give the best results; this is especially true of pharmaceutical laboratories where tested volumetric apparatus is rarely supplied and facilities for calibration are not at hand. If the increased accuracy of results is believed to be more than counterbalanced by the work involved by this plan, and that the results of the first or second plan will be sufficiently correct, then, other things being equal, the second procedure should be given the preference, since sulphuric acid once standardized will retain its strength almost indefinitely, and new alkali can be set upon it at any time, while alkaline solutions, with their affinity for carbon dioxid and solvent action on glass, will not long remain of constant strength.

THE AMMONIUM SULPHATE METHOD FOR STANDARDIZING SULPHURIC ACID.

The standardization of volumetric sulphuric acid as ammonium sulphate has been suggested by M. Weinig,* and is so extremely simple that it seems to be especially adapted for the purpose in hand. Weinig recommended to add to an accurately measured volume of the acid to be standardized a slight excess of ammonia water, evaporate to dryness, dry for one-half hour in an oven at 115° to 120° C., and from the weight of ammonium sulphate found to calculate the sulphuric acid contained in the volume of acid used. F. S. Shiver † finds that the ammonium sulphate so obtained has an acid reaction, showing that the salt has lost ammonia in drying. He overcomes this error, due to the dissociation of the ammonium sulphate in the evaporation, by moistening the residue obtained with a few drops of ammonia water, and drying as before. The residue so obtained was neutral to delicate litmus paper, and its weight somewhat greater than when the second treatment was omitted, and Shiver accepts these figures as more correct, and recommends such a modification of the original method. Felix Marboutin and A. Pécoul ‡ tried Shiver's recommendations, and report low and variable results, and ascribe them to loss of ammonia in drying. Operating at varying temperatures, they find that when the residue is dried at a temperature of 65° to 80° a constant weight, and one agreeing with theory, can be attained, and that the ammonium sulphate is neutral to test paper. At a temperature of 85° to 100° an increase in weight, accompanied by an acid reaction of the residue, was noted. This is said to be due to loss of ammonia and subsequent absorption of moisture by sulphuric acid formed. When the temperature was increased to above 100° a decrease in weight was again observed. The contradictory results just quoted will indicate that the method is not as reliable as at first supposed. Personally, I can support the authors last quoted only in part, having experienced no difficulty in obtaining a neutral residue, and one of practically constant weight, when following Shiver's directions; thus 25 Cc. of a sulphuric acid to be standardized was neutralized with ammonia water, evaporated to dryness on a water bath, moistened with ten drops of ammonia water, again carefully brought to dryness on a water bath, and then dried in an oven at 115° to 120°, gave these weights:

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* Ztsch. angew. Chem., 1892, p. 204.

† J. Am. Chem. Soc., 1895, p. 351.

‡ Chem. Centralblatt, 1897, 2, p. 981; from Bull. Soc. Chim., Paris, 17, p. 880.

Weight after drying for one hour	1.6583 Gm.
“ “ “ “ two hours (total)	1.6566 “
“ “ “ “ three hours “	1.6566 “
“ “ “ “ four hours “	1.6563 “
“ “ “ “ five hours “	1.6562 “

A duplicate determination gave:

Weight after drying for one hour	1.6583 Gm.
“ “ “ “ two hours (total)	1.6571 “
“ “ “ “ three hours “	1.6571 “
“ “ “ “ four hours “	1.6571 “

On the other hand a temperature of 65° to 80° yields a neutral residue, and it can be brought to absolutely constant weight if dried sufficiently long, 24 hours being frequently insufficient.

If it is acceded that one or the other of these procedures avoids loss of ammonia by dissociation, there still remain other possible causes to be considered and guarded against. One lies in the fixed residue always found in ammonia water, and which will be weighed and calculated as ammonium sulphate, yet this, in my experience, can be neglected, I never having found so great an amount of solids in ammonia water as to cause an error of more than one milligram when operating upon 10 Cc. of normal acid and avoiding a material excess of ammonia.

There is another source of error which I desire to mention, and the cause of which I cannot explain at the present time. As before stated, I have had no difficulty in drying the ammonium sulphate residue to a constant weight when using a temperature of 115° to 120°, and that it seemed to be perfeclty neutral in reaction; yet when such a residue was again moistened with a few drops of ammonia water and again dried an increase in weight was noted; thus a residue weighing 1.6562 Gm. when moistened with 10 drops of ammonia water and again brought to constant weight weighed 1.6574 Gm. Similar treatment increased a residue of 1.6544 Gm. to 1.6553 Gm. When operating at 65° to 80° a residue of 0.6574 Gm. was moistened with 5 drops of ammonia water, and when again dried to constancy it weighed 0.6586 Gm., and once more moistened and dried it increased to 0.6590 Gm. It seemed possible that this increase in weight might be caused by the combination of some product of the combustion of gas used to heat the drying oven with the free ammonia to form a fixed residue; yet this was not the case, since considerable portions of ammonia water evaporated and dried in a similar manner yielded but trifling residue, and these corresponded with those obtained when the same volume of ammonia water was brought to dryness in a desiccator over sulphuric acid. In view of the above the following method was adopted: 10 Cc. of the volumetric acid were measured into a wide, flat-bottomed weighing bottle and weighed, the stopper then removed, 2 Cc. concentrated ammonia water added, and the whole brought to dryness on a steam bath, rotating the flask occasionally toward the end, so as to avoid the formation of a crystalline crust, which interferes with drying, and then dried to constant weight in a drying oven at a temperature of 65° to 80° C. From the weight of the residue, 0.0002 Gm., the amount of solids found in 2 Cc. of the ammonia water used were deducted, and the remainder calculated into sulphuric acid, and from this the amount in 1000 Gm. obtained. The amounts of sulphuric acid in 1000 Gm. thus found are: A, 47.5103; B, 47.5395; C, 47.5103; D, 47.5321; E, 47.6241; F, 47.5409; G, 47.5874 or an average of 47.5492 Gm. The specific gravity of the solution being 1.0318 at $\frac{20^\circ}{20^\circ}$ the temperature employed in titrations, and 1000 Cc. therefore contain 49.0612 Gm., and the acid has a factor of 1.0031.

On the whole the results obtained with this method appear quite satisfactory; taking the average as 100 the highest result exceeds this by but 0.15 per cent., while the lowest figure is only 0.08 per cent. below the average, and seems well adapted to the requirements of the pharmacist, the need of maintaining a constant temperature being the only drawback.

SODIUM CARBONATE AS A STANDARD FOR ACID SOLUTIONS.

Sodium carbonate is without doubt the most generally used substance for standardizing volumetric acids, thus it is given preference in nearly all text books on quantitative analysis, and is the official method of the new British Pharmacopœia. The advantage of using sodium carbonate lies in the ease with which sodium bicarbonate can be purified and then converted to the normal carbonate by simple ignition; to this may be added that with the degree of purity of sodium carbonate as now on the market a purification should rarely be necessary. As objections to this method of procedure may be mentioned that when litmus is used as indicator the solution of sodium carbonate must be repeatedly boiled during the titration, so as to expel carbon dioxid, or else methyl orange must be the indicator employed; this latter indicator, although the inferior sensitiveness as compared with litmus claimed by Reinitzer[*] and Thomson[†] is contradicted by Lunge,[‡] does not give a pronounced change of color, and requires some experience to obtain satisfactory results. Other faults found with sodium carbonate are the possible formation of sodium hydroxid if too strong a heat is used to convert the acid carbonate to the normal salt, or if the heat employed is insufficient the conversion to the normal carbonate may be incomplete, and finally, since sodium carbonate is quite hygroscopic, much care must be taken when weighing the sample preparatory to titration.* As far as personal experience is concerned, no trouble was had in igniting sodium bicarbonate to an absolutely constant weight when the platinum crucible was heated in such a way that its bottom was a dull red. This heat was continued for thirty minutes, the crucible cooled over sulphuric acid and weighed rapidly while covered. Further heating for several hours never showed the least loss of weight. Of the two indicators I give litmus the preference, as giving a more decided color change, quantities of 1 to 2 Gm. of sodium carbonate requiring with methyl orange 0.05–0.1 Cc. more of normal sulphuric acid to produce an acid reaction than when litmus was used and carbon dioxid expelled by frequent boiling; thus a solution of sodium carbonate, portions of 25 Cc. of which required 27.8, 27.8 and 27.8 Cc. of normal acid when methyl orange was the indicator used, consumed, when litmus was used, 27.75, 27.75, 27.7 and 27.75 Cc.; again, a solution, portions of 25 Cc. of which required with methyl orange 29.25, 29.35, 29.30, 29.35, required with litmus 29.25, 29.25, 29.25 Cc. of normal acid.

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[*] Zeitschft. f. angew. Chem., 1894, pp. 547, 573 and 643.

[†] Ztschf. f. anal. Chem., 24, pp. 22, 27, 47.

[‡] Ztschf. f. angew. Chem., 1894, 733.

The following titrations, undertaken with a view of establishing the value of the volumetric acid used in these experiments, will show that this method gives very concordant results when proper precautions are taken.

The method of procedure adopted consisted in placing in a tared platinum crucible 2 to 4 Gm. of Mallinckrodt's sodium bicarbonate, found to be free from sulphates and chlorides, and exposing this to the heat of a small flame of a bunsen burner, the heat being just sufficient to bring the bottom of the crucible to a dull redness, until a constant weight was obtained. The weight being noted, the sodium carbonate so obtained was rinsed into a beaker, litmus solution added, and then the acid allowed to flow in, proper precautions being taken to avoid loss of fluid by effervescence, until the blue color began to disappear, and then boiled for one minute, again acid added and boiled, and this repeated until the color of the solution became a permanent red, care being used to avoid an excess of acid.

Sodium Carb. Weighed.	Cc. of Normal Acid req. by Theory.	Cc. of Acid Used.	Calculated Factor of Acid.
1.1983 Gm.	22.64 Cc.	22.675 Cc.	0.9940
1.1722 "	22.15 "	22.15 "	1.0000
2.1818 "	41.22 "	41.35 "	0.9968
2.2932 "	43.33 "	43.3 "	1.0007
2.2292 "	42.12 "	42.325 "	0.9987
2.2543 "	42.6 "	42.65 "	0.9988
2.1931 "	41.44 "	41.5 "	0.9992
		Average..........	0.9983

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* E. Rimbach, Berichte, 26, 171.

A pure sodium carbonate (Koenig's) heated to constant weight in portions of about 2 Gm. gave the following results:

Sodium Carb. Weighed.	Cc. of Normal Acid req. by Theory.	Cc. of Acid Used.	Calculated Factor of Acid.
1.9987 Gm.	37.76 Cc.	37.85 Cc.	0.9976
1.9992 "	37.78 "	37.75 "	1.0008
2.1237 "	40.13 "	40.05 "	1.0019
2.0160 "	38.05 "	38.05 "	1.0000
2.3480 "	44.36 "	44.3 "	1.0001
		Average	1.0001

It is seen that as far as agreement of duplicate determinations is concerned these figures leave nothing to be desired, that two different specimens give closely agreeing results, and that the average factors of these do not widely differ from the figure obtained with the ammonium sulphate method. The average of these three is the factor adopted for the sulphuric acid used in this work, thus:

Sodium carbonate, from bicarbonate, gives factor	0.9983
Sodium carbonate, drying c. p. salt, " "	1.0001
Ammonium sulphate method " "	1.0031
Average	1.0005
Factor adopted for normal sulphuric acid used in this work	1.0005

Bearing in mind the principle adopted by the compilers of the Pharmacopœia to introduce only such analytical methods as require a moderate amount of skill, apparatus, etc., experiments were made with a view of doing away with the use of platinum crucible and desiccator, and also to avoid danger of absorption of moisture in the weighing of the sodium carbonate.

Experiment A. Approximately, 20 Gm. of the sodium bicarbonate used in the previous titrations, contained in a porcelain evaporation dish, was exposed to the full heat of a bunsen burner flame for ten minutes, the inner cone having a height of 5 Cm., and the tip of this cone being in contact with the bottom of the dish, the salt being stirred during the ignition so as to assure a uniform heating. After the heat had been continued for ten minutes the flame was removed, and the salt, when partially cooled, was transferred, in quntities of 1.5 to 2 Gm., to clean and dry homeopathic vials, these being corked at once. When the vials were cold the cork was momentarily removed to equalize atmospheric pressure, and the total weight ascertained; the sodium carbonate now being poured into a beaker, the bottle and cork were weighed back. The titration of the weighed portions of carbonate so obtained was conducted as before.

Experiment B was carried out just as A, except that a smaller flame, 2–3 Cm., was used.

Experiment C. Again just as in A, using the full flame, continuing the heat, however, for twenty minutes.

Experiment.	Sodium Carbonate Taken.	Normal Acid req. by Theory.	Cc. of Acid Used.	Calculated Factor of Acid.
A	1.4733 Gm.	27.84 Cc.	27.9 Cc.	0.9978
A	1.5793 “	29.84 “	29.9 “	0.9980
A	1.5358 “	29.02 “	29.05 “	0.9989
A	1.6844 “	31.83 “	31.85 “	0.9994
A	1.4814 “	27.99 “	28. “	0.9997
				Average, 0.9990
B	1.5385 “	29.07 “	29.1 “	0.9990
B	1.4982 “	28.31 “	28.35 “	0.9986
B	1.5304 “	28.92 “	28.93 “	0.9996
B	1.5190 “	28.7 “	28.7 “	1.0000
				Average, 0.9993
C	1.5333 “	28.97 “	29. “	0.9990
C	1.4862 “	28.08 “	28.1 “	0.9993
C	1.4271 “	26.96 “	27. “	0.9984
				Average, 0.9989

It is seen that the results so obtained are extremely satisfactory, and it would seem that little objection can be made against the use of sodium carbonate as a means of standardizing volumetric acid, especially when the conversion of the acid-carbonate is carried out as in the preceding experiments.

BORAX AS A STANDARD FOR VOLUMETRIC ACID SOLUTIONS.

While, upon the recommendation of Salzer,[*] the use of borax in alkalimetry is suggested in Mohr's Volumetric Analysis, it does not seem to have been used until Rimbach,[†] verifying the observation of Joly,[‡] who found that boric acid is not affected by methyl orange, and that by the use of this indicator the alkali in borates may be estimated with volumetric acid as if a solution of alkali hydroxid were at hand, made use of this reaction in determining the atomic weight of boron, and proposed the use of borax as a means of standardizing volumetric acid. Since then Perman and John,[§] apparently in ignorance of Rimbach's publications, have made a similar recommendation. The advantages claimed for borax are: 1st. Borax as found on the market is quite pure, or can at least easily be obtained pure by recrystallization. 2d. It is neither hygroscopic nor efflorescent, and therefore will retain the correct amount of water of crystallization indefinitely. 3d. On account of the high molecular weight of borax a large quantity can be operated on. In standardizing a normal acid 5 Gm. of borax may be used, and hence weighings need not be very exact. 4th. The end reaction is sharp.

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[*] Ber. d. chem. Gesell., 26, 430.

[†] Ber. d. chem. Gesell., 26, 164.

[‡] Compt. rend., 100, 103.

[§] Chem. News, 71, 296.

That borax is quite pure, or can readily be freed from impurities, seems to be shown by examinations published, also that moist crystals of borax when exposed to the atmosphere will lose adhering water without losing any water of crystallization,* and this is an important point, since it is here that many of the salts proposed for similar purposes are found at fault. On the other hand Droop Richmond † believes it necessary to estimate the amount of water of *crystallization* in each sample. That a large amount of salt can be used for each titration is a decided advantage, especially to the pharmacist who does not always possess a sensitive balance nor accurate weights. The sharpness of the end reaction may, however, be called in question. To the objections to methyl-orange already stated must here be added that the color change is not sharply defined. In the titrations reported below good results could only be obtained by adopting a certain shade to which to titrate, just as Rimbach did in his work on boron. Whether this procedure is allowable I am much in doubt, for while the addition of one drop (0.03 Cc.) of normal sulphuric acid added to 100 Cc. of water containing one drop of methyl-orange T. S. produces a decided pink color, when titrating 5 Gm. borax, dissolved in 100 Cc. of water, and containing one drop methyl-orange solution, the color finally fades away and a most faint pink tinge appears; to obtain a shade as intense as that produced by 0.03 Cc. normal acid in pure water requires a further addition of 0.05 to 0.1 Cc. of acid, and it is a question at what point the reaction should be considered complete; in consequence of this each operator will adopt a certain point at which the titration is to be considered complete, and will therefore obtain concordant results, while different operators, as a result of this gradual change, will obtain results showing some slight variation, but which will hardly vary more than 0.1 Cc. when 5 Gm. borax are operated on.

To determine if borax of definite composition can readily be prepared a number of commercial samples were recrystallized. In 400 Cc. of hot water were dissolved 100 Gm. of borax, the hot solution filtered and set aside to cool. After 24 hours the crystals and supernatant liquid were transferred to a plain filter, the crystals allowed to drain, and then exposed to the atmosphere for 24 hours. Five specimens (C, D, E, F, G) were thus purified by pharmacy students in the month of January, two

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* Rimbach, *Ibid.;* Ramsay and Aston, Trans. Chem. Soc., 1893, 207.

† Chem. News, 725.

(A, B) by myself during hot weather in July. Specimen A was in well-defined crystals, while in B the solution was vigorously stirred from the time that crystals began to form until the separation was deemed complete.

In the titration of the salt, approximately 5 Gm. were weighed accurately, dissolved in 100 Cc. of water by gently warming, and when again cooled to room-temperature one drop methyl-orange solution added and neutralized with the volumetric acid used in the preceding work. As the end of the titration was taken at a point when, by comparison with a solution containing a quantity of borax, water and indicator similar to the one being titrated, it was seen that the solution no longer was of a pure yellow, but had assumed a faint pink tinge. As the temperature of the volumetric solution when used for the titration of borax was 26° C., while all previous titrations were conducted at 20° to 22° C., the volume of acid used was reduced to the volume it would have measured at 21° C.

The following titrations of specimen A show that in this way a satisfactory agreement of duplicate estimations may be obtained:

Borax Taken.	Normal Acid req. by Theory (1 Cc.=0.19046 Gm. Cryst. Borax.	Volume of Acid Used.	Calculated Factor of Acid.
5.0244 Gm ..	26.38 Cc.	26.47 Cc.	0.9966
5.2487 " ..	27.56 "	27.64 "	0.9971
5.0201 " ..	26.36 "	26.42 "	0.9977
5.0109 " ..	26.31 "	26.37 "	0.9973
5.0277 " ..	26.40 "	26.47 "	0.9973
			Average, 0.9972

The remaining samples titrated in the same way gave the following mean values:

Factor for acid based on borax, Specimen A	0.9972
" " " " " " " B	0.9969
" " " " " " " C	0.9953
" " " " " " " D	0.9943
" " " " " " " E	0.9977
" " " " " " " F	0.9932
" " " " " " " G	0.9947

All these values are below that accepted as a result of standardization with sodium carbonate and as ammonium sulphate; specimen A falls 0.28 per cent. below, and specimen F 0.74 per cent below, and volumetric solutions based upon the latter specimen of borax would cause values to be obtained which are 0.74 per cent. too low, assuming the factor 1.0005 to be strictly correct.

In offering the result of his experiments the writer refrains from drawing conclusions or making suggestions as to method to be adopted for the next revision of the Pharmacopœia, but trusts that the data offered may be an aid to the committee to whom this work will be entrusted.

NOTES ON ESTIMATING EUCALYPTOL.

BY LYMAN F. KEBLER.

From the great variety of oils of eucalyptus met with in commerce, it would seem that each species (about 120) of the Eucalyptus genus, yielded a distinctly characteristic oil. Just how to differentiate the officially recognized oils from the undesirable material is not an easy task; especially when it is remembered that the United States Pharmacopœia recognizes the oils distilled from the fresh leaves of *Eucalyptus globulus*, Labillidaire; *Eucalyptus oleosa*, F. v. Muller, and some other species of *Eucalyptus*.

The specific gravity is a valuable indicator, when the oil is "straight," but the oils can be so mixed as to render this factor of little service. The same is true of the rotatory power. The phellandrene test is of considerable service, but what is wanted, after all, is the amount of eucalyptol in the oil.

In 1894, Mr. L. R. Scammell* took out a patent for the preparation of eucalyptol on a large scale. The basis of this patent is the property of eucalyptol to form a crystalline compound with phosphoric acid of a certain strength. The process consists in adding concentrated phosphoric acid (sp. gr. 1.75 to 1.785, preferably the latter), in slight excess, to the oil at the ordinary temperature, but not above 60° F. The eucalyptol phosphate crystallizes out, is purified by pressure or centrifugally, and is then decomposed with hot water.

Just how far this process will lend itself to quantitatively estimating eucalyptol is fairly well settled. Mr. Faulding, commenting † on the method, lauds it to the skies, but does not give any data for his affirmations. Mr. Helbing,‡ on the other hand, considers the method valueless for quantitative work. It is with the latter that the writer's experience coincides. For estimating eucalyptol the method is unsatisfactory, but as a means for detecting the presence of eucalyptol in oil, it is of much service. This is good so far as it goes, but the all-essential, how much, is lacking.

The writer has made some experiments along another line that may be of interest. The eucalyptol phosphate is obtained by cooling the oil in ice-water, gradually adding half its volume of phosphoric acid, with agitation, cautiously keeping cool. The contents of the beaker can readily be kept cool as follows: add the acid to the oil, cool the mixture in ice-water, then slowly agitate with a glass rod until uniformity results. After preparing the eucalyptol phosphate, it is purified between folds of filter paper by means of heavy pressure. This portion of the work having been *well* done, the solid mass ought to consist of eucalyptol, phosphoric acid, and traces of water and oil constituents, aside from eucalyptol. By weighing this addition product we have the combined amount of eucalyptol and phosphoric acid. Now by treating the eucalyptol phosphate with hot water, decomposition results, and the phosphoric acid can readily be estimated by titrating witha volumetric solution of potassium hydroxide. The eucalyptol is easily obtained by difference.

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* 1894. Eng. Pat., No. 14,138, July 23d.

† 1895, Chemist and Druggist, 46, 310.

‡ Pharm. Record, No. 33, page 26.

The method as executed by the writer is as follows: 8 grammes of the oil are weighed out in a suitable beaker, cooled in ice-water, 4 Cc. of phosphoric acid (1.75) added and again placed in ice-water. After cooling, the contents of the beaker are slowly and thoroughly mixed by means of a glass rod, the eucalyptol phosphate removed, purified by pressure, weighed, decomposed with hot water, and the acid estimated by means of a standard alkaline solution. Of course, it is understood that smaller quantities can be worked with. It is necessary to add more of the phosphoric acid in some cases. This is true in the case of pure eucalyptol. Twice the above amount was added for the results obtained in this paper.

The result obtained by the above process for pure eucalyptol and a number of oils are given in the table below. Other data are also included.

Number.	Specific Gravity at 15° C.	Grammes of solid Eucalyptol Phosphate.	Per cent. of Eucalyptol, by Difference.	Per cent. of Eucalyptol, Direct.
1	0.9350	14.78	103.75	62.14
2	0.9153	10.70	73.62	31.20
3	0.9116	8.10	54.75	23.17
4	0.8912	7.13	43.62	24.29
5	0.8955	3.50	23.37	—
6	0.8876	Did not congeal	—	—
7	0.9081	Did not congeal	—	—
8	09.424	9.9	73.84	49.23

No. 1 was pure eucalyptol. Nos. 2 and 8 were marked fancy oils, and commanded a high price. The remaining oils are such as are commonly met with in the wholesale trade.

The solid eucalyptol phosphate was obtained from 8 grammes of substance. The per cent. of eucalyptol, by difference, was obtained by the above process. The per cent. of eucalyptol, direct, was obtained by Mr. Scammell's process.

The above method does not give absolute results, as can readily be seen from the amount of eucalyptol, in pure eucalyptol, but the results are close approximations. The method will undoubtedly be of service, being short and easily executed.

Philadelphia, August, 1898.

INCREASE OF DENSITY IN DISTILLATES FROM WINES AND OTHER SPIRITUOUS LIQUORS.*

BY A. B. LYONS.

The specific gravity of the distillate should not be taken immediately after it is brought to standard volume. The condensation which takes place when alcohol is mixed with water, seems not to be completed immediately. During the distillation the stronger spirit which comes off first remains floating on the surface of the denser portion of distillate which comes over later. At the close of the distillation the whole product is shaken to make a homogeneous mixture. The mixing of the denser with the lighter portion is attended, of course, with condensation, generally sufficient to be easily noted. If now the specific gravity of the mixture is taken immediately after the shaking together, and again after an interval of half an hour or an hour, it will be found that further condensation has taken place during the interval. Such a gradual progressive condensation of mixtures of alcohol and water seems to have been known or suspected by Townes when he constructed his alcohol table, for he allowed his mixtures of alcohol and water to stand two days before taking their specific gravity, but nothing is said about it in the instructions given for determining alcohol in liquors by distillation.

Having occasion some time ago to make a large number of determinations of alcohol quite accurately, it occurred to me to test this point. In at least twenty distillates I took the specific gravity immediately after mixing and bringing to standard volume, without even taking time to cool the fluid to exact standard temperature; and again after intervals of half an hour, an hour, six, twelve and twenty-four hours. Of course, the specific gravity was reduced in every instance to that at a standard temperature.

In only one instance was there no increase in density after the first weighing. In every other case there was very considerable increase during the first thirty minutes, and in some a maximum density was not reached during the first hour. The maximum once reached, there was no further change. The distillates tested ranged in strength from ten to forty per cent. by volume, and the apparent falling off in strength was generally as much as one-tenth of one per cent., in some cases nearly three times that amount. Indeed, this source of error in exact determinations of alcohol I found to be more important than any other likely to vitiate the work of a reasonably careful operator, unless it be neglect of rigorous attention to temperatures at the several stages of the manipulation.

I may add that I found the same slow condensation to go on in mixtures of commercial alcohol with recently boiled distilled water.

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* Excerpt from a paper on "The Chemical Examination of Wines," read before the Michigan State Pharmaceutical Association, August, 1898.

AMYL NITRITE AND ITS ASSAY.

BY RICHARD FISCHER AND J. A. ANDERSON.

Under direction of Edw. Kremers, of Research Committee G. for Revision of U. S. P.

In an article on The Assay of Spirit of Nitrous Ether,* the authors reviewed the methods in vogue for the estimation of ethyl nitrite. The gasometric method received special attention and a number of factors of at least theoretical importance were carefully ascertained, and several erroneous notions generally held were dispelled. Of the titrimetric methods, the estimation by saponification and the estimation by the oxidation of ferrous ammonium sulphate were tried and such modifications of the processes as found in literature, as at the hands of the authors proved productive of better results, were suggested. The experimental work on the ethyl nitrite had already been closed when the article by C. Smith,† on Examination of Commercial Samples of Amyl Nitrite and Spirit of Nitrous Ether, and a new method for their valuation appeared, so that the results obtained by the potassium chlorate method, as modified by Smith, could not be compared with those obtained by the three methods tried. The three methods referred to were, however, applied to the assay of amyl nitrite with the results herein recorded.

The amyl nitrite was used in the form of an approximately five per cent. solution in absolute alcohol. The assay was in each case made as soon as possible. The amyl alcohol, from which the nitrite was prepared, was rectified according to Hirsch's method, and upon redistillation collected between 129 and 132°.

For the gasometric method new determinations for vapor tension had to be made; the solubility of the nitric oxide in the brine also had to be redetermined. The method pursued for the determination of the vapor tension was the same as followed on a former occasion and described in Pharm. Archives, 1898, p. 163. The results obtained are recorded in the following table. The barometric change, varying from 740.5 Mm. to 741 Mm., was so slight as to be negligible.

Temp.	Dry air admitted.	Vol. of air under tension.	Effect of T. in Cc.	T. in Mm.
13°	45.9 Cc.	46.65 Cc.	0.75 Cc.	12.0
16°	46.5 "	47.45 "	0.95 "	14.9
17°	46.8 "	47.48 "	1.00 "	15.5
18°	47.0 "	48.00 "	1.00 "	15.5
19°	47.1 "	48.20 "	1.1 "	16.9
21°	47.4 "	48.60 "	1.2 "	18.3
22°	47.6 "	48.90 "	1.3 "	19.8
23°	47.7 "	49.10 "	1.4 "	21.3
24°	48.0 "	49.70 "	1.7 "	23.4
25°	48.2 "	49.90 "	1.7 "	24.5
26°	48.5 "	50.30 "	1.8 "	28.0

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* Pharm. Archives, 1898, pp. 161–169.

† Am. Journ. Pharm., 70, p. 223.

The solubility of the nitric oxide in the brine was determined in a manner corresponding to that described in Pharm. Archives, 1898, p. 164.

The results directly calculated from experiments, also the approximations calculated from the first set of data, are given together in the following table :

Barom. pressure.	Temp.	Volume of nitric oxide Admitted.	Undissolved.	Dissolved.
737 Mm.	13°	40.30 Cc.	39.2 Cc.	1.1 Cc.
	14°	....	....	1.04 "
737 "	15°	40.57 Cc.	39.5 Cc.	0.97 "
	16°	....	....	0.91 "
737 "	17°	40.85 Cc.	39.0 Cc.	0.85 "
	18°	....	....	0.82 "
737.5 "	19°	41.14 Cc.	40.35 Cc.	0.79 "
737.5 "	20°	41.29 "	40.55 "	0.74 "
737.5 "	21°	41.42 "	40.7 "	0.72 "
	22°	....	....	0.695 "
737 "	23°	41.72 Cc.	41.05 Cc.	0.67 "
	24°	....	....	0.63 "
737 "	25°	41.99 Cc.	41.4 Cc.	0.59 "

The amyl nitrite used in this work was prepared according to three methods, and each product was assayed according to the three methods mentioned below.

I. A quantity of amyl nitrite was prepared according to the U. S. P. directions for making ethyl nitrite. As to quantities, due allowance was naturally made for the difference in the molecular weights of amyl and ethyl alcohols. The crude product was rectified first by collecting the distillate up to 100°. Then this distillate was washed, neutralized, dried and redistilled, collecting as amyl nitrite the portion which came over between 95 and 100°. From 98.3 grams of amyl alcohol, 118 grams of crude product were obtained, which yielded 48 grams of rectified amyl nitrite.

This product when dissolved in absolute alcohol and assayed, gave the following results :

1. According to the gasometric method :

Expt.	Gms. of 7.140 per cent. alc. sol. used.	Vol. of nitric oxide, read.	corrected.	Temp.	B. P.	Percentage purity.
A.....	3.8505	49.25 Cc.	44.07 Cc.	19.75°	725 Mm.	83.93 per cent.
B.....	3.8795	49.63 "	44.41 "	19.50°	735 "	83.97 "
C.....	3.8775	49.4 "	44.21 "	19.50°	735 "	83.60 "

2. According to the saponification method.

Expt.	Gms. of 7.140 per cent. alc. sol. used.	$\frac{N}{10}$ $Na_2S_2O_3$ V. S. required	Percentage. purity.
A.	3.8630	19.8 Cc.	83.93 per cent.
B.	3.8330	19.6 "	83.63 "
C.	3.8447	19.7 "	83.81 "
D.	3.8521	19.7 "	83.35 "

3. According to oxidation method.

Expt.	Gms. of 7.14 per cent. alc. sol. used.	$\frac{N}{10}$ $Na_2S_2O_3$ V. S. required.	Percentage purity.
A.	3.5650	18.4 Cc.	84.42 per cent.
B.	3.7210	19.1 "	83.94 "
C.	3.6925	19.0 "	84.6 "

II. Another quantity of amyl nitrite was prepared according to Redwood's process for making ethyl nitrite after the directions of A. B. Tanner.*

The yield according to this method was very small, a large part of the amyl alcohol being converted into valerianate. From 50 grams of amyl alcohol, but 6.5 grams of amyl nitrite, fraction 95 to 100°, was obtained, *i. e.*, about one-eighth of the theoretical yield. A 5.01 per cent. solution of this in absolute alcohol was prepared, and this alcoholic solution was assayed according to the same processes.

1. According to the gasometric method.

Expt.	Gms. of 5.01 per cent. alc. sol. used.	Vol. of nitric oxide. read.	corrected.	Temp.	B. P.	Percentage purity.
A..	3.8500	31.00 Cc.	28.38 Cc.	23.5°	739 Mm.	77.02 per cent.
B..	3.8416	31.90 Cc.	28.26 Cc.	23.5°	739 Mm.	76.82 "
C..	3.8447	31.95 Cc.	28.36 Cc.	23.2°	739 Mm.	77.51 "

2. According to the saponification method.

Expt.	Gms. of 5.01 per cent. alc. sol. used.	Cc. $\frac{N}{10}$ $Na_2S_2O_3$ V. S. required.	Percentage purity.
A.	3.8900	12.8 Cc.	76.74 per cent.
B.	3.8645	12.7 "	76.60 "
C.	3.8926	12.8 "	76.71 "

3. According to the oxidation method.

Expt.	Gms. of 5.01 per cent. alc. sol. used.	Cc. $\frac{N}{10}$ $Na_2S_2O_3$ V. S. required.	Percentage purity.
A.	2.5840	8.65 Cc.	78.02 per cent.
B.	2.6130	8.70 "	77.72 "
C.	2.5790	8.60 "	77.81 "
D.	2.5965	8.70 "	78.10 "

III. Lastly amyl nitrite was prepared by the action of nitric acid alone on amyl alcohol. Inasmuch as the reaction of the strong nitric acid upon the alcohol is apt to result in violent explosions, Rennard's † suggestion to use an acid of the specific gravity 1.30 was followed. Even if this precaution is taken the yield, as is also stated by Rennard, is small.

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* Am. Journ. Pharm., 44, p. 23.

† Proc. American Pharmaceutical Association, 22, p. 236.

From 41 grams of alcohol but 10 grams of a fraction distilling between 95 and 100° were obtained. Of purified product a 6.07 per cent. solution in absolute alcohol was made and this alcoholic solution was assayed in the same manner in which the first two products were analyzed.

1. According to the gasometric method :

Expt.	Gms. of 6.07 per cent. alc. sol. used.	Vol. of nitric oxide, read.	corrected.	Temp.	B. P.	Percentage purity.
A....	3.8650	39.00 Cc.	34.76 Cc.	21.0°	735.2 Mm.	77.57 per cent.
B....	3.8754	39.10 "	34.73 "	21.5°	735.0 "	77.28 "
C....	3.8560	38.95 "	34.63 "	21.5°	735.5 "	77.48 "
D....	3.8561	38.95 "	34.63 "	21.5°	735.5 "	77.48 "

2. According to the saponification method :

Expt.	Gms. of 6.07 per cent. alc. sol. used.	Vol. $\frac{N}{10}$ $Na_2S_2O_3$ V. S. required.	Percentage purity.
A............	3.9077	15.7 Cc.	77.28 per cent.
B............	3.8995	15.6 "	76.92 "
C............	3.8850	15.6 "	77.25 "

3. According to the oxidation method :

Expt.	Gms. of 6.07 per cent. alc. sol. used.	Vol. $\frac{N}{10}$ $Na_2S_2O_3$ V. S. sol. required.	Percentage purity.
A............	3.0360	12.6 Cc.	79.79 per cent.
B............	3.0899	12.8 "	79.70 "
C	3.0750	12.8 "	80.08 "
D............	3.0530	12.7 "	80.03 "

Judging from the experiments here recorded, it would seem that the first method, based upon a slight modification of the U. S. P. process for the preparation of ethyl nitrite, not only gives the greatest yield, but also the purest article. This process is also more convenient than the other two. The writers are fully aware that this generalization is based on a rather limited range of experiments, yet, in a general way, it is in harmony with the results obtained by Rennard[*] when he passed nitrous acid into alcohol. There certainly is, however, a practical advantage in the use of nitrous acid generated from sodium nitrite and sulphuric acid to that generated from nitric acid and starch, which was employed by Rennard.

A comparison of the above tables reveals this fact, that the oxidation method gives the highest results. This is possibly due to the presence of a small amount of air in the flask, to exclude which entirely is very difficult. This is also the most troublesome method, though it does not require as much time as the saponification method ; yet a fair portion of a day may be necessary in order to obtain satisfactory results.

In the saponification method the reaction can be hastened by the use of stronger potassa solutions, *e. g.*, twice or thrice normal, and by frequent shaking. Several days' contact will ensure a complete reaction. The greatest care should be observed in securing perfect joints.

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[*] Loc. cit.

For every-day use, the first or gasometric method is the best of the three. It is not only the most expeditious, but with the necessary corrections sufficiently accurate results are obtained.

Finally, two commercial samples of amyl nitrite were assayed according to the gasometric method. The results given in the following table are not without interest:

Expt.		Gms. of alc. sol. used.	Vol. of nitric oxide read.	Vol. of nitric oxide corrected.	Temp.	B. P.	Percentage purity.
I.	A.	3.8753	10.5 Cc.	9.62 Cc.	22.4°	728 Mm.	20.93 per cent.
	B.	3.8635	10.5 "	9.58 "	22.9°	728 "	20.91 "
	C.	3.8580	10.3 "	9.435 "	22.7°	728 "	20.61 "
II.	A.	3.8350	27.1 "	23.68 "	26.0°	741 "	75.35 "
	B.	3.8290	27.0 "	23.60 "	26.0°	741 "	75.21 "
	C.	3.8399	27.2 "	23.78 "	26.0°	741 "	75.58 "

Of sample I, a 6.21 per cent solution in absolute alcohol was prepared for assay. The ester itself was obtained from the prescription counter of a druggist. It came from a one oz. bottle with blue wrapper and glass stopper.

Sample II. was assayed in the form of a 4.29 per cent. solution. The druggist from whom it was obtained kept it in small glass pearls as put up by the manufacturer.

Out of nine drug stores visited only four had amyl nitrite in stock.

Laboratory for Practical Pharmacy, University of Wisconsin, August, 1898.

PRACTICAL USEFULNESS IN PHARMACY OF PRECIPITATED CALCIUM PHOSPHATE.

BY JOSEEH FEIL, PH. G.

For centuries past, the number thirteen has been rightly or wrongly regarded as connected with misfortune and disaster; in the language of the day, it is a veritable Jonah, and no better additional evidence can be brought forward to substantiate this claim than that thirteen preparations in the present U. S. P. were ordered made with the aid of precipitated calcium phosphate on various chemical and physical grounds, and the supposed advantages are in about every case clear disadvantages; in fact it seems difficult to understand the reasons for its sudden adoption in many important galenicals when the thoroughness of all the pharmacopœial work is considered.

The insolubility of the substance in ordinary menstrua, its whiteness, its tendency to stability and its non-toxic nature seemed to favor its use; but as the sequel will show, its pharmaceutical usefulness had been overlooked, otherwise it is quite certain it would never have been adopted.

Theory, when properly applied, is always of value, but it should never determine by itself the practical application of any substance and the replacement of other things or processes that have passed through the fire of experience unscathed.

It is hoped in our next Pharmacopœia the utility of every change will be added to the discoveries of the experimental laboratory before adoption.

In comparing the *Aquæ* of the 1880 and 1890 Pharmacopœias, Prof. Arny has shown that the introduction of precipitated calcium phosphate has tended to render unstable waters that were fairly stable before, and those that easily deteriorated have had this undesirable quality intensified.

The cause of this I believe is due to the very slight solubility of the precipitated calcium phosphate in water, which undoubtedly serves as pabulum for the confervoidæ, which thus have not only a better chance to get a foothold, but increase faster when once formed.

The following is an approximate condition of the medicated waters prepared by 1880 and 1890 processes after standing six months, taken from the paper above quoted.

WATERS.	Amount of "Growth."	
	Process 1880.	Process 1890.
Anise	slight	very heavy
Camphor	clear	heavy
Cinnamon	slight	clear
Fennel	heavy	very heavy
Peppermint	clear	slight
Spearmint	slight	slight

Its use in the case of tincture of opium is far more serious. It is well-known that laudanum as found in drug stores is rarely of proper strength. Among the reasons assigned for this deficiency is that the precipitated calcium phosphate reacts with the morphine meconate and sulphate contained in the opium in some manner so as to produce alkaloid salts insoluble in diluted alcohol.

To investigate this statement the following experiments were made:

Experiment 1. Morphine meconate and sulphate in the proportion found in opium was dissolved in diluted alcohol then precipitated calcium phosphate and added in quantity used proportionately in the preparation of tincture of opium; this was occasionally shaken during a maceration of six hours; it was then filtered, the magma thoroughly washed with distilled water at ordinary temperatures until free of dissolved matter, then percolated with boiling alcohol. The alcohol percolate gave tests for morphine and phosphoric acid, showing some morphine phosphate formed.

Experiment 2. Morphine sulphate was dissolved to the extent of 1.3 grams in 100 Cc. diluted alcohol, to imitate tincture of opium of full U. S. P. strength. This was then treated by the assay process for the preparation named.

A similar experiment was made, except that the solution of morphine sulphate was shaken with precipitated calcium phosphate in proper proportion to make this quantity of tincture of opium; it was shaken at intervals during six hours, then filtered, the magma thoroughly washed and the filtrate treated as in solution 1.

The difference in the amount of morphine obtained after repeating the experiments, was about one centigram in favor of solution 1.

From these experiments it seems that while a small quantity of morphine phosphate forms, it is too infintesimal to practically affect the strength of tincture of opium prepared by its aid.

There is, however, another objection to the use of calcium phosphate in this preparation. This objection is entirely from the physical standpoint; instead of aiding the percolation it actually retards it, and a gallon of laudanum, a common quantity frequently prepared, requires at least a week for preparation; too much time for such a commonly used tincture. But why percolate? Maceration certainly was a success in this case and ought to be again ordered.

And, lastly, we have the use of this chemical in the preparation of some of the syrups. Here, while not particularly objectionable, it is not superior to many cheaper substances, such for instance as washed pulverized pumice stone. Syrup of ginger has a finer flavor when prepared directly from soluble oil of ginger dissolved in alcohol and added to simple syrup, and the same statement may be made regarding syrup of orange-peel. Syrup of tolu is stronger medicinally when prepared with the aid of magnesium carbonate.

It is quite evident that judged from the standpoint of pharmaceutical utility precipitated calcium phosphate would not be missed if dropped from the U. S. P.

Cleveland, O., August 1, 1898.

SOME COMMON LIQUID FOODS.

BY ELIAS H. BARTLEY, M. D., BROOKLYN, N. Y.

Much has been written in recent years upon the subject of food and the science of dietetics. Hand-books, brochures and journals are not wanting from which we may obtain information in relation to the usual foods, but less attention has been paid to the consideration of liquid foods.

This subject is very important, from the fact that the feeble and the invalids of the community are largely dependent upon them for sustenance. The general public, and especially those who are most likely to be called upon to provide food for the sick, should have some definite information on the subject of the relative value of these liquid foods. It not infrequently happens that even the physician is none too well informed upon the subject, and hence he will often content himself with giving the most vague and general directions for feeding his patients, and that to an attendant who has little or no knowledge upon such subjects, however much she may wish to do the right thing.

By far the greater part of the nursing of the sick is done by an over-anxious wife, mother, sister or other relative of the afflicted one. A very natural appreciation of the overwhelming consequences of the outcome of the sickness often unnerves the brain, unsteadies the hand, or warps the judgment. What meaning to such an anxious, heavy-hearted mother or wife, tired out by sleepless nights and constant watching day after day, can be imparted by such expressions as "a light diet," "a nutritious liquid diet," or "good nourishing food," and like expressions. In fact, little conception of just what is meant by these hackneyed expressions is conveyed to any of our minds.

It is my purpose to discuss some of these liquid foods, in relation to their use and value as nourishment, confining my remarks to those used in the sick room.

As is known to most of you, we divide the constituents of foods into three classes:

1. The proteids represented by albumin as found in the white of eggs, lean meat, etc.

2. Carbohydrates, represented by starch, the sugars, etc.

3. The fats, represented by butter, fat of meats, milk and the vegetable oils.

We estimate the value of a food by the amount of these constituents which it contains, as determined by chemical analysis. When this is known, we determine the food value or heat-producing power of these constituents. This is to be modified by a study of the other offices than heat production, which each class of food constituents performs in the body.

The proteids are used to build up the tissues, the fats to assist in the digestion of the proteids and starch, and to add to our store of reserve food in the body, as well as to give heat. The carbohydrates, starch and sugars, to furnish heat and muscular power and brain force. It has been determined that the heat and power derived from food in the body is the same as that produced by burning the same food outside the body. This heat of combustion is determined by the instrument called the colorimeter, and the heat is measured by observing how many kilograms of water it will raise one degree in temperature. The heat required to heat a kilogram of water 1° C. is always the same, is a definite amount, and is called a calorie. It is by this unit that fuels and foods are measured and compared with one another. Thus, when we say that one ounce of sugar will furnish 116 calories, or one ounce of dry albumin will furnish 116 calories, and one ounce of fat will give 263 calories of heat, we mean that one ounce of the foods when burned in the body, will furnish to the body enough heat to heat respectively 116 to 263 kilograms of water, 1° C.

Nearly all foods have been analyzed as to their contents of these proximate principles. From such analyses, which have been published, it is easy to calculate the amount of heat a given weight of any food will furnish. Indeed, we have published tables giving approximately the heat furnished by a unit weight of most ordinary foods. The heat value of foods is also determined directly by burning a known weight of the food in question in a calorimeter. The heat value or dynamic value of foods affords us a ready means of estimating their food value, and of comparing one food with another.

It is now admitted by all physiologists that dynamic energy or heat value does not express the whole value of many foods. There is a stimulant value that does not seem to come from the combustion of the food, but from the effect upon the nerve cells or blood current; especially is this true of many liquid foods. We all know that a glass of water, either very cold or very hot, has a refreshing or stimulating effect.

Brunton has called attention to the fact that when water or other fluid is sipped slowly, it has a much greater stimulant effect than when drunk rapidly. The same is true of alcoholic drinks. The rapid effect of fluids as stimulants is probably due to their rapid absorption, and the rapid filling up of the blood vessels and lymph vessels, the quickening of the heart, and a consequent feeling of exhilaration. Liquid foods then may have an effect as true foods, furnishing material to feed our tissues, and produce heat and a stimulating effect upon the nervous system or heart. The first effect is due to the presence of sugar, starch, albuminous matters or fats, while the second effect is due partly to the water, partly to the inorganic salts, and partly to a group of substances generally called extractive matters. These extractive matters are most abundant in the liquid meat preparations.

It is not necessary for us to enter upon a discussion here of the chemical nature of these substances. They are complex and vary with the preparation in question. The value of such preparations is not alone that of a true food, but also that of a stimulant to the heart and nervous system. Both of these effects are valuable to the invalid and the debilitated, and to persons whose digestive powers are unable to cope with solid foods. It must be borne in mind, however, that where the digestive organs are able to digest solid food, it is not proper to withhold it. It seems to be a well established principle that any organ whose function is not called into action soon loses that function. Hence, to feed a stomach with predigested food, is to relieve it from duty and cause it to degenerate. Predigested foods, then, must be regarded as temporary makeshifts to tide an enfeebled digestion over an emergency. To a less extent, the same may be said of liquid foods. If there be an exception to this rule, it is in the case of milk. We know that for a time, varying in different mammals, the young live exclusively on milk. We also know that after a certain development of the digestive organs has occurred, the animal demands solid food, and fails to thrive if it is withheld.

In the treatment of certain diseases in the human subject, we find great benefit in an exclusive milk diet for a limited time, but it cannot be persisted in for too long a time, for the patient usually becomes unable or unwilling to continue, because of his disgust for it.

With most liquid foods, the amount of food value, in proportion to the volume of liquid, is small, and large quantities of it must be taken to get enough nutriment to sustain the body. The volume of liquid necessary is a cause of disturbance. We should then clearly understand the place that liquid foods occupy in a dietary. They cannot take the place of solid food in the healthy, but may serve as accessory foods and stimulants. With the sick, when digestion is enfeebled or when the stomach refuses solid food, liquid food serves a useful purpose, and may constitute for a limited time the sole nourishment.

For convenience of consideration, we may divide these foods into the following classes:

1. Milk, and milk foods.
2. Farinaceous foods, such as gruels, etc.
3. Meat preparations. Some of these are solid in the powder form, some as a paste, and others as liquids.
4. Alcoholic beverages and alcoholic foods.

Milk is a type of a perfect food, *i. e.*, it contains all the necessary constituents of a food, including the salts. Cow's milk contains approximately 3.35 per cent. of fat, 3.75 per cent. proteid matters and 4.5 per cent. of sugar, besides the salts. 100 grams of whole milk gives 67.5 calories. 1 ounce of whole milk gives 19.3 calories of heat. One glass of milk (8 oz.) represents then 154.4 calories, heat value.

To give 3,000 calories, the necessary daily ration, would require approximately twenty tumblers of milk. Allowing four tumblers to the quart, it would require about five quarts of milk to furnish an average man doing ordinary work with the necessary food for twenty-four hours. An invalid, or a man in illness, would require less, say four quarts.

Butter-milk and skim-milk, while not equal to whole milk, furnish 11.5 calories per fluid ounce, or 92.0 calories per glass of eight ounces. These two foods are greatly underestimated by the public. While whole milk sells for two cents per glass, butter-milk sells for one cent, and furnishes about two-thirds as much nourishment. It generally agrees well with the digestive organs, and with some persons is more easily tolerated than whole milk. The small amount of lactic acid it contains prevents uncomfortable fermentations in the stomach.

Koumyss and kefir are fermented milks, containing a little less sugar than milk, a small amount of alcohol (1.5 to 2 per cent.) and some lactic acid. Their chief claim as an improvement upon milk rests upon the small amount of alcohol and lactic acid, and the presence of carbonic acid which makes them more palatable. It has been claimed that proteid matters are modified by the ferment, but this I cannot affirm. They are stimulating foods.

Whey is well suited to some forms of weak digestion. Its composition is, approximately, fat 1 per cent., albumin 0.5 per cent., sugar 4.5 per cent., and salts 0.7 per cent.

A glass of whey corresponds to about 72 calories or nearly one-half as much as whole milk. It should be made with rennet as follows:

A teaspoonful of essence of pepsin is added to one pint of milk warmed to about 100° F. (body temperature), and kept there with frequent vigorous stirring until the casein is thoroughly coagulated and beaten into a hard tough mass, and then strained through cloth or a fine strainer.

FARINACEOUS FOODS.

These are mostly called gruels and soups. They are made in a variety of ways, and their preparation is beyond the limits and purposes of the hour. Their value as foods depends upon the flour or meal from which they are made, and whatever else they are made to contain, such as salt, sugar, buttermilk, wine, etc. They should be well cooked and for a long time, so as to render the starch soluble and even change a part of it into dextrin, the first stage of starch digestion. For young children this is of special importance, and baked flour, or flour inclosed in a cloth bag and boiled in water for a long time, is frequently used. Both the dry baking and the boiling in water have for their object the conversion of the starch into soluble dextrin. Gruel made with such a flour has the advantage of flavor or taste and more ready digestibility. Farina, Imperial Granum, Eskay's Food, and a number of other foods for children are prepared in some such way.

The ordinary flour gruel, corn meal gruel, oatmeal gruel and similar liquids or semi-liquids, cannot claim any advantage over the more solid preparations, except that which comes from their taste or flavors imparted by added substances, and the ease with which invalids can take them in the liquid form.

Liquids may often be taken when there is no appetite, or when there is a disgust for solid foods. Gruels made with milk, or milk and water, are quite nutritious, and are valuable means of giving nourishment to the sick.

The gruels made with water do not generally contain as much actual food as milk. Ordinarily, gruels made with 20 Gms. of flour to a cupful of water (250 Cc.) and sweetened, contain 2 per cent. of proteid matters, 6 per cent. of sugar, 12 per cent. of starch, and furnish 120 calories. Nine to ten cups of such gruel would furnish the necessary amount of heat force for a bed-ridden person, *i. e.*, 1,200 calories, but it would not contain enough proteid matter. It would contain but 20 Gms. of proteid matter, while such a person should receive 75 to 80 Gms. at least. Repeated experiments show that not all the proteid matter of the cereals is digested, so that not more than 15 to 18 Gms. would actually be received by the patient, against 55 Gms. that would be taken in the same amount of milk. It is very evident that a person could not be properly nourished on such gruel alone, as it is difficult for a person to take more than 2,000 Cc., 8 cups (2 quarts), of it in twenty-four hours. Oatmeal, barley and bean meal contain more proteid matter than wheat flour.

Bean and pea soups, much used in Germany, are not much used in this country, but contain more proteid matter than those made from the cereals. Pea soup, as used abroad, contains 3.4 per cent. of proteid matters, 0.9 per cent. of fat, and 5.5 per cent. of extractive matter and carbohydrate. It gives 0.138 calories per Gm., per litre 133 calories. This is a little more heat than is given by a cup of flour gruel, but there is at the same time more proteid and less starch, and 8 or 9 cups of it would fairly well nourish a bed-ridden person.

When milk is substituted for a part of the water in flour gruel, we have a much better food. This is a common article of diet for the sick, and is logical and nutritious. Sugar is a form of food which is acceptable to most palates, and furnishes a food that imposes little effort upon the digestive organs. There is but one drawback upon it as a food, and that is in the disagreeable effects liable to result from fermentation. Sugar ferments with great readiness, and especially when the digestive organs are weakened by disease. This should be borne in mind, and when there is any tendency to fermentation in the stomach or intestines, it should be withheld, lest it may do mischief. When the digestive apparatus will tolerate it, sugar may be given as a food, as well as for flavoring otherwise insipid or unpleasant foods. As a rule, it is best not to make the food too sweet for invalids, as it obtunds the appetite and is liable to derange the digestion by promoting disagreeable fermentations.

MEAT PREPARATIONS.

These are ready-made products found in the markets or home made beef teas and meat broths of various kinds. Some of these found in the markets are in the form of powders, more or less soluble in water, and intended to be dissolved in water before administering. Some of them are partially digested, while others are merely extracts made with water, or are the liquid pressed out by hydraulic pressure and preserved with salt or alcohol. Their value as foods depends upon their contents of albumin or gelatin. Their value as stimulants depends upon the presence of certain extractive matters, not albuminous, and the salts of the meats from which they are prepared. We may divide them for convenience into the following classes:

1. Home-made broths.
2. Ready-made broths and meat juices, made by a cold process.
3. Beef extracts, evaporated by heat.
4. Partly pre-digested meat preparations.

To the first class belong the time-honored beef tea, mutton broth, veal broth, chicken broth, oyster broth, clam broth, etc.

For the sake of uniformity, we may take beef tea, mutton broth, veal broth, chicken broth, oyster broth and clam broth all made by one of the many methods, as follows:

One pound of meat in each case is chopped fine, put in a quart fruit jar, covered with about a pint of water, allowed to stand two hours, and then put into a pan of cold water, and the water in the pan boiled gently for one to three hours. These directions are those most often used, and furnish what is ordinarily called beef and other broths. Some modify this by adding sodium carbonate, common salt or hydrochloric acid.

Ready-made meat juices: Valentine's, Wyeth's, Parke, Davis & Co.'s, Bovinine, etc.

Beef extracts: Liebig's, Armour's, etc., also Ankers' capsules.

Directions: ʒi to cup of water.

1. Pre digested preparations: Liquid Peptonoids, Panopepton, Trophonine, etc.
2. Mosquera, Beef meal, Beef jelly, Somatose, Beef peptones, etc.

FOOD VALUE OF GELATIN.

Gelatin composes a very considerable part of all the cooked meat foods. Its value as food is not that of albumin. Animals cannot live on gelatin to the exclusion of the true proteids. It can, however, take the place of a part of this constituent of our food. It has been found that about one-half of the necessary proteids of our diet can be replaced by gelatin, but it requires twice as much, and by some more, gelatin as the proteid displaced. We ordinarily require and take about 12 to 13 grains of proteid matter for each pound of body weight, or for a man of 150 pounds, 1,900 grains, or 4.3 ounces. By taking 4⅓ ounces of dry gelatin, the proteids may be reduced to one-half of this amount. This would require about one quart or two pounds of the ordinary wine jelly. This is more than most of us could take even for one day.

As ordinarily given, the three or four ounces of jelly given in a day represents about one-half of gelatin, which, according to our figures, would represent but one-fourth ounce of proteid, or one-sixth of a day's proteid allowance. This is assuming that the diet of proteids is kept up fairly well with other foods. Munk found that when the albumin was reduced below ten grains per pound body weight per day, it required much more than twice as much gelatin as the albumin lost to maintain equilibrium. He says it took twelve to fifteen times as much gelatin as of the albumin lacking from the normal ration. This is equivalent to saying that gelatin can take the place of a small amount of proteid in our food, but an animal cannot eat enough of it to prevent loss of flesh and strength. Munk found in his experiment on dogs, after reducing the proteid to ten grains per pound body weight, that the large amount of gelatin could not long be digested, and he was obliged to feed more proteid to restore the animals to health. It will be seen, then, that it would be impossible for a person to get from beef tea and jelly enough nitrogenous food upon which to exist, and unless some milk, egg or other form of proteid is added, the patient must suffer from lack of nitrogenous food. When gelatin is given with farinaceous or milk foods, it may serve a very useful purpose, and is logical. When given alone, or with beef tea, chicken broth, etc., it is of little value, because these foods already contain about as much gelatin as the body can use. The chief value of gelatin is as a saver of waste of muscular and nervous tissue. In fevers, where this waste is most rapid, gelatin reduces the waste, provided enough proteid is given with it to repair the tissues. This is why it is found to be of use, and is refreshing to the sick, under these circumstances.

We cannot measure the value of liquid meat preparations as we do other foods, alone by the heat they will give. This gives only their food value. There is another value which we have termed their stimulant value. This property is due partly to the water, partly to the salts, and partly to the extractives. The large amount of water taken with them fills up the blood vessels and adds to the volume of blood which has been depleted by the illness, especially noticeable in fevers of all kinds. This in itself gives the patient a feeling of well-being, temporary to be sure, but nevertheless it is a matter of great benefit while it lasts. The salts of potassium, the phosphates, and the common salt, have a decided stimulant effect on fevers. The extractives have also a stimulant effect upon the heart and nervous system. We all know that the patient seems to be stimulated by the fever, and that he is weakened when the fever leaves him. The cause of this well-observed fact is probably due to these very extractive matters which are produced in the body in increased quantity in all acute fevers; that is, while the temperature is high. As soon as the temperature falls to normal, the destruction of tissue and the production of these substances also decreases. Is it then that these meat solutions, carrying these extractives, are of such benefit to the patient? During the height of the fever, the most useful constituent of these meat preparations is the gelatin, because it is a very valuable sparer of tissue waste. As we have above said, its chief use in the body is as a sparer of proteids. Hence when the tissues are undergoing rapid waste, under the influence of fever, they are saved somewhat from destruction by gelatin. During the convalescence, there is less need of gelatin, although when added to other proteid foods, it hastens the rebuilding of the tissues.

When the bodily health has been restored, the use of beef tea and beef extract is unnecessary, and their free use rather clogs the system after the first stimulant effect is over with these extractives, and puts upon the system the extra labor of getting rid of substances that furnish no adequate return for this labor. This clogging effect is most marked in gouty and rheumatic subjects, who are much better without them. The stimulant effect of these meat preparations is very beneficial in the convalescence from alcoholic excess. Indeed, while withdrawing the stimulant alcohol, I know of no substitute stimulant which is more beneficial than some of these preparations. I have said very little of the effects of the salts which some have regarded as of so much value, because that is a complex physiological problem, difficult to present here.

To sum up then, it is not correct to say that beef tea is of no value because it contains no real nutriment. While it cannot sustain us, furnish heat and muscular tissue, it does have other uses and effects equally valuable under certain diseased conditions.

ALCOHOLIC BEVERAGES.

The nutritive value of alcohol has been the subject of much discussion and not a little experimentation. Some of the experiments tend to show that when taken in small non-poisonous doses, it may furnish heat by its partial oxidation, and that it spares the tissues from oxidation and waste. Others have tended to show that it has little value as a food, and that the deleterious effect of the alcohol upon the tissues more than counterbalances its value as a food or energy producer. Even when taken in comparatively small amounts, it is seldom entirely oxidized in the body, and no inconsiderable amount of it is exhaled in the breath. It has been estimated that a human body in a state of health can burn about two ounces of alcohol in twenty-four hours. This is the equivalent of four ounces of whisky, eight ounces of sherry, or forty to eighty ounces of average beer.

What shall we say of the man who drinks thirty ounces of whisky or an indefinite amount of beer?

When alcohol is burned in the body, it is to be regarded as a carbohydrate, furnishing heat only. It furnishes 7 calories per Gm., while sugar furnishes 4.1 calories. While it produces this rather large amount of heat, it lowers body temperature when given freely.

It cannot be doubted that alcohol acts as a poison upon the tissues. Its deleterious effects are partially localized in the stomach, interfering with normal digestion, and irritating the mucous membrane of the stomach, and partially diffused in other organs, as the liver, kidneys, and especially in the nervous system. While it retards tissue waste when taken in small amounts, it increases tissue waste when given in larger quantities. It is, therefore, to be regarded as a food to a certain extent, and as a drug rather than a food in other respects. Even regarded as a food, it is certainly an expensive one, and is attended with certain well-marked disadvantages and accompanying injury to the body.

It is generally regarded as a stimulant rather than as a nutriment, and its stimulant action is due to its local irritant effect upon the nerve centers. The continued irritant effect soon produces a benumbing or paralytic effect when the nerve cells are unable to control body movement or brain actions, and in excessive doses they may fail to keep up the heart's actions. In these effects it plays the part of a drug or poison. There are a few physiologists who claim that alcohol is never a stimulant, but always a depressing agent, and that it has no value as a food.

It may be stated with confidence that alcohol in any form is unnecessary for the use of the healthy human body. It is laid down as a rule by those who have studied its use among laborers and soldiers, that under any and all circumstances the average man can stand more fatigue and accomplish more work without alcohol than with it. It is a matter of interest that the Esquimo do not seem to know anything about alcohol, and have no such drink, while all or nearly all savages of tropical countries have their alcoholic beverage.

The alcoholic beverages may, conveniently for our purposes, be divided into—

1. Distilled liquors.
2. Fermented liquors or wines.
3. Malt beverages, as ales, porters, stouts and lager beers.

As the first class are nearly pure alcohol and water, we may dismiss them with the remarks already made.

The wines contain a small amount of sugar and other carbohydrates derived from the grape or other fruit, but this is so small that it does not amount to much in comparison with what we may obtain in bread, potatoes, etc. No one would think of drinking wine to save bread.

The third class demands a little more attention, as a food, than the other two, because of the general impression that they represent a great deal of nourishment.

The term beer is properly applied to all those drinks manufactured from barley, malt, hops and yeast. There are a number of varieties, such as summer beer, winter beer, bock beer, export beer, etc., which names are more fanciful than otherwise. A well-made beer contains from 3 to 5 per cent. of alcohol, carbonic acid, 0.1 to 0.3 per cent.; maltose and dextrin, 4 to 5 per cent.; albumin and other nitrogenous substances, 0.5 to 0.2 per cent., with traces of glycerin, organic acids, bitter principle and aromatic substances from the hops, and 0.18 to 0.28 per cent. of ash.

It cannot be denied that such beer does represent a certain food value. Rubner says that a litre (1 quart) of average beer contains as much proteid matter as four ounces of milk or two ounces of bread, or nearly as much as one ounce of meat: and carbohydrates equal to those furnished by 3½ to 4 ounces of bread. The total heat value of a litre of beer, including the alcohol, he gives as 450 calories, and therefore about half as much as an equal weight of meat or potatoes.

A little more than one-half this calculated heat would be produced by the alcohol. This calculation assumes that the alcohol is completely burned in the body, which seldom or never occurs. The results are, therefore, somewhat too high.

To counterbalance this statement of Rubner, we must take into account the effect of the beer upon normal digestion. Repeated experiments have shown that beer exerts a very great retarding effect upon digestion of starch in the stomach.

Prof. Chittenden has reported a very interesting series of experiments on this subject, and Sir William Roberts has shown that the digestion of meats is also retarded. In a series of experiments outside of the body, Roberts compared the time required for the completion of the digestion of known weight of dried meat fiber, with artificial gastric juice, with and without the addition of different amounts of different beers. The heavy English ales had a greater retarding effect than the light beers. Using such a proportion of gastric juice and meat that the digestion was completed in 100 minutes when no beer was added to the mixture, he found that the addition of 10 per cent. of Burton ale delayed the digestion to 115 minutes; 20 per cent. of this ale delayed it to 140 minutes, and the same amount of light table beer delayed it to 115. Forty per cent. delayed it to 200 and 140 minutes, respectively. Sixty per cent. of Burton ale almost completely stopped the action, while the same amount of light beer delayed the completion of the digestion to 180 minutes.

This probably explains why some persons find that beer taken with meals produces a heaviness in the region of the stomach, as though the meal did not digest easily. It is more probable that the retarding effect of beer upon stomach digestion is not the same in all persons. It is also very likely that the effect in a living stomach is different from that in a test tube, for the most of the alcohol is removed from the stomach, as well as a considerable portion of the other substances held in solution, long before the completion of the digestion of an ordinary meal, and any deleterious effect of these substances removed. We must not be too hasty therefore in reaching conclusions from experiments in digestion made outside of the body. When we turn to the observed effect on individuals, and examples are not wanting, we see that beer has a fattening effect upon most persons who take considerable quantities of it. We also notice that these same persons lose flesh when they are deprived of it.

So far as these observations go, it seems to promote the storing of fat in the body. That this effect is not due alone to the alcohol it contains is rendered probable by the fact that the same amount of alcohol taken in the form of wine or distilled spirits does not produce the same fattening effect. If the fattening effect is not due to the alcohol, we must look to the other constituents, to the water, carbohydrates, or the hop constituents.

The carbohydrates present in the beer are in solution, are more rapidly absorbed, and probably produce a more marked effect than if they were in the form of starch.

There is with most persons a rapid feeling of refreshment after a single glass of beer, out of proportion to the amount of alcohol present, or to the same quantity of alcohol taken in other beverages. This is probably due to the rapid absorption of some other ingredient of the beer, or to the effect of the beer in promoting the absorption of certain salts and sugars of the food. Indeed, Tappenier has shown that weak alcoholic solutions do have a marked effect in this last respect.

Another beneficial effect of beer when taken with or before a meal is the stimulation of the appetite by the hop-bitter. This enables the person to eat more of other foods, and perhaps more than the present needs of the body demand. It is well known that the free use of water promotes the well-being of the body, and in some cases seems to promote the storing of fat. This is another of the ways in which beer may fatten.

The frequent and prolonged use of beers, while they may supply a certain amount of nutrition and fatten the body, produces certain digestive troubles. Chronic catarrh of the stomach, fatty heart and certain other diseased conditions, have been attributed to their use.

If we accept Rubner's figures as to the nutritive value of beer as above given, the cost of this food is much more than the equivalent amount of bread, milk or meat.

A quart of beer costs, by the glass, 20 cents. By the pint, 14 cents. An equivalent amount of proteid matter in the form of milk (4 oz.) costs one cent, and in the form of meat it costs about one and a half cents, while an equivalent amount of carbohydrate in the form of bread (4 oz.) costs about one and one-fourth cents.

Assuming that the alcohol of the beer is all burned, and that it does no harm to any of the normal processes, we find that in calculated heat value one liter of beer is equivalent to 5½ ozs. of bread, costing 1⅔ cents, or to 23 ozs. of milk costing 6 cents, or to 13 ozs. of average meat costing 13 cents.

When compared to the staple articles of food, beer must be regarded as an expensive food, and one attended with certain other disadvantages.

REPORT OF THE SPECIAL COMMITTEE ON RESEARCH.*

To the Section on Scientific Papers: The chairman of the Special Committee on Research begs leave to submit a third annual report.†

The work of the committee through the year 1898–99 has been continued in two main ways by which advancement can be made, namely: (1) in literary research and bibliography, (2) in experimental research by scientific method.

In order to make progress, technical and scientific, it is first necessary to know what facts have been established by others, and it is then a duty to find further facts in extension of knowledge for the uses of man.

In co-ordinating the labors of the several workers in and with the committee, a good deal of correspondence has been carried on, as questions have arisen and as plans have been developed. It has been found, however, that a large part of the work has arisen from the personal plans of the several members of the committee. Some of the purposes are older than the organization of this committee, whose service may be no more than to present results with full justice to their individual authors, in the spirit of utility to the interests of pharmacy.

IN LITERARY RESEARCH.

In the bibliography preparatory to experimentation upon the assay of alkaloidal drugs and galenicals, the following work has been written: "*Alkaloidal Estimation: a biographical index of chemical research, prepared from original literature by Paul I. Murrill, under direction of Albert B. Prescott. Published and distributed by the Committee of Revision of the Pharmacopœia of the United States, 1890–1900.*" The published methods of quantitative work for alkaloids are here indexed and summarized for the twenty years ending in 1897, with inclusion of a few earlier papers and of the first quarter of 1898. The journal sets and monographs drawn upon number 65, of which the ten most comprehensive publications were searched consecutively through the twenty years ending 1897. There are 326 articles indexed, the highest number in one year being 34 for 1887. In the ten years ending in 1887, there were 138 articles; in the ten years ending in 1897, 167 articles. The articles have been contributed by 212 authors, counting joint authors as one. In nationality the authors appear to have been, in order of greatest numbers, German and Swiss, English, American, French, Russian, Dutch, Italian. Among authors contributing the greatest number of articles are: Keller (C. C.), Squibb, Lyons, Beckurts, DeVrij, Dieterich, Flückiger, in about the order named. The eminent writers in analytic chemistry, such as Dragendorff, Hager, and A. H.

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* This Report should have appeared on page 241 *et seq.*, but was omitted through an unfortunate oversight. THE GENERAL SECRETARY.

† For second annual report see Proceedings American Pharmaceutical Association, vol. 45, 1897, p. 172.

Allen, have been but moderately prolific of articles in journals on this subject. The alkaloids on whose estimation the most has been contributed are, in order, morphine, alkaloids in general, caffeine, total cinchona alkaloids, quinine, strychnine, emetine. Only twenty-four alkaloids appear in the literature of quantitative analytical work. The order of the bibliography is chronological, with full descriptive titles, references to publications, an index of authors, and one of subjects.

The Chemical Bibliography of Morphine, 1875 to 1896, described in the last report of this committee (Proc. Am. Phar. Assoc., 1897, p. 174) has been published in the Pharmaceutical Review and Archives and distributed in a reprint of sixty pages.

Historical Monographs on Standard Drugs, by John Uri Lloyd, have continued to appear in various avenues, and those of the past year especially should have registration in this report. THE LLOYD LIBRARY, which has made this literary research possible, is closely related to the bibliographic work of this committee, and is a resource to all its members. In the preparation of these monographs, Mr. C. G. Lloyd is the botanical authority, and Dr. Sigmond Walbott does library work. A series of fifteen of these monographs has been prepared at the request of Mr. C. P. Englehardt, and has appeared in the Western Druggist, volumes xix and xx. This series includes articles as follows:

Aloe Socotrina, xx, Aug.
Areca Catechu, xx, 195.
Cephaëlis Ipecacuanha, xix, 346.
Citrullus Colocynthis, xx, 243.
Copaifera officinalis, xx, 54.
Croton Tiglium, xx, 151.
Hydrastis Canadensis, xix, 59.
Jateorhiza Calumba, xx, 8.
Physostigma venosum, xix, 243.
Punica Granatum, xix, 202.
Quassia amara, xix, 7.
Strophanthus Hispidus, xix, 403.
Strychnos Nux Vomica, xix, 109.
Vanilla planifolia, xix, 548.
Veratrum viride, xix, 447.

Among others of the historical monographs of the same author have been the following:

Oil of Gaultheria, in conjunction with the investigations of Prof. Kremers, Phar. Review, 1898, p. 176.
The California Manna, following a request of Prof. Flückiger, Am. Jour. Phar., 1897, p. 329; Ber. Deutsch. Phar. Ges., vii., 245.
The Destruction of Tobacco in Virginia, by same request, Am. Jour. Phar., 1897, p. 557.
Note on the History of Percolation, Am. Drugg., 1897, p. 282.

Literature on Capillarity was issued by Professor Lloyd in "A Study in Pharmacy," for private distribution. This is a bibliography of monumental proportions, giving record of 328 works from 1452–1519 to 1872, and to be continued. The titles are made descriptive for the wants of the reader of the present time, and are accompanied with critical annotations by the compiler himself.

The Lloyd Library (to which this Association has contributed) has been increased in the past year by about one thousand volumes of works on botany, pharmacognosy, and pharmacy. On January 1, 1898, it contained on botanical subjects 4,619 bound volumes and about 2,000 pamphlets; on pharmacy and materia medica 3,715 bound volumes and about 1,000 pamphlets. Among the rare works lately added are a list of the earlier and less accessible of the pharmacopœias of foreign countries.

IN EXPERIMENTAL RESEARCH.

On the Volatile Oils.—This extensive field was accepted by Edward Kremers, at the Montreal meeting, as a field in which he had been some time specially engaged, first upon the terpenes in Europe, and afterwards in continued investigations of these and other oils with his students in his own laboratory. The method of work is therefore systematic rather than desultory, and all known results are to be brought to bear upon the very complex and difficult questions of true and safe standards of purity, so as to avoid fallacious requirements. Since the Minnetonka meeting the work in hand has been as follows:

I. Detailed in papers published during the year, by Edward Kremers.
  1. Volatile Oils and their Assay (read in abstract at Minnetonka Meeting), Phar. Review, xv. 196.
  2. Criticism of a proposed method for the Assay of Senega, *Ibid.*, xvi. 45.
  3. On the occurrence of Methyl Salicylate, *Ibid.*, xvi. 100.
  4. On the Volumetric Estimation of Methyl Salicylate, *Ibid.*, xvi. 130. (The 2d, 3d, and 4th papers were by Dr. Kremers and Miss M. M. James.)
  The Oil of Gaultheria, its early pharmaceutical history, by John Uri Lloyd, named among the contributions from literary research, belongs to this series of subjects.
  5. Benzinum, U. S. P., *Ibid.*, xvi. 221.

II. Papers in course of preparation for report upon work already done, to be presented as far as possible at the Baltimore meeting.
  1. Monograph on Methyl Salicylate. By Edward Kremers.
  2. Monograph on Benzalhydroxy-Cyanide. By the same.
  3. The assay of Ethyl and Amyl Nitrites and their methods of preparation, with a bibliography. By R. Fischer and J. A. Anderson. This subject was taken up in Dr. Kremers' laboratory, at request of Dr. Charles Rice.
  4. The Assay of Thymol and Carvacrol, and the influence exerted by an excess of Iodine. By Edward Kremers and others.

III. Preliminary work has been done by Dr. Kremers upon the following named subjects:
  1. The Assay of Cynalyl Acetate.
  2. The Assay of Menthol and of Menthyl Esters.
  3. The Oil of Cloves, its changes, and the Assay of Eugenol and Eugenol Acetate.
  4. Changes in Oil of Bay.
  5. The influence of Terpenes on the Acetylization Method for the Assay of Alcohols.
  6. Attempt to assay Pulegone by splitting it into Wallach's methylcyclohexenone and acetone, and assay of the latter.
  7. Examination of commercial samples of Oil of Turpentine.
  8. Preparation of Inactive Pinene regenerated from the nitroso-chloride for the study of its physiological behavior. (Bearing on "Terebene.")

9. Study of physical properties of regenerated Carvene (?) preliminary to the study of its physiological behavior (Dr. Kahlenberg and Mr. Stevens).
10. Further work on the Monarda Oils.

In concert with some of these investigations certain work has been done by Dr. True and others under direction of Professor Henry H. Rusby in Committee C. of the Committee of Revision.

The main features of Dr. Kremers' work have been to take up the principal constituents of the volatile oils and to make a thorough study of them in all their bearings in so far as they are of interest to pharmacy, directly or indirectly. For certain reasons he has commenced with the ethers, though having plans for a great deal of work upon the hydro-carbons.

In General Pharmaceutical Assaying.—Dr. A. B. Lyons has resumed his former work in this subject. He has prepared another specific gravity table in continuation of those he contributed about ten years ago, namely: *A Gravity Table for Solutions of Citric Acid.* He is also to offer a paper *On the Chemical Examination of Wines.* In this paper he will set forth the fact that alcoholic distillates, also mixtures of alcohol and water, increase appreciably in density on standing. *A Paper on Botanical Nomenclature*, as concerning indigenous plants, will be presented by Dr. Lyons, at the Baltimore meeting. *A critical review of the more important methods of alkaloidal assay* may be expected from the same author at an early period.

The Chemistry of Cascara Sagrada is to be continued in study by Dr. Alfred R. Dohme. He desires to do further work upon the glucosides and their products, and upon purshianic acid, which he has surmised to be a trioxy-dimethyl-anthraquinone. *The Chemistry and Assay of Digitalis*, in review of the recent work of Professor C. C. Keller, is a subject deemed by Dr. Dohme very important for pharmacy, and if possible he will work more at length upon it himself. An article appears from him in Druggists' Circular, August, 1898. The *Chemistry of Aloes* receives a contribution, with assays, from the same author in Americal Journal of Pharmacy, August, 1898.

A series of articles *on the histology and pharmacognosy of leading drugs*, by Dr. Dohme, has appeared in the "Druggists' Circular," as follows:

On Liquorice, Arnica, and Turpeth, Aug., 1897.
Ipecac, Lobelia, Senega, Columbo, and Soap Bark, Sept., 1897.
Bittersweet and Marshmallow, Oct., 1897.
Quassia and Pomegranate, Dec., 1897.
Cascara Sagrada and Savine, Feb., 1898, vol. xlii, p. 29.

In Pharmacognosy, applied to the identification of drugs by structure, by Prof. J. C. Schlottorbeck, the following papers are to be recorded:

1. A comparison of Datura Stramonium with Datura cornucopia and Datura metaloides, with estimations of total alkaloids. The Pharmacologist, i. 65.
2. Clove bark. An anatomical study. *Ibid.*, i. 97.

3. Anatomical study of an undetermined species of Datura from Bahama Islands. To appear in the Pharmacologist, ii. 1.
4. Development of the Cotton Seed (Gossypium herbaceum). Desires to present this paper at Baltimore meeting.
5. Development of Cacao Seed (Theobroma Cacao). Nearly ready.

The above named papers are by Dr. Schlotterbeck and Mr. A. Van Zwaluwenburg.

6. A confirmatory microscopical test for the identification of inuline. A pharmacognostical study of Ilex Cassine (with Miss A. Coulter).
7. Experiments on a new color test for Cotton-seed oil.
8. Development of the seed of Lobelia inflata.
9. Study of several new species of Croton, with special reference to the development of the seed.

(7, 8, and 9 are subjects for work to be taken up.)

In the Chemistry of Taraxacum Professor Sayre has accomplished further analytical separations, and at the Baltimore meeting is to present a paper on "The alkaloid of Taraxacum root." It is his conclusion that there is an alkaloid in Taraxacum, a body responding to general alkaloid tests, and which he has obtained in proportion of about 0.002 per cent.

The Standards for White and Black Mustard Seeds, and for Acacia, subjects which have been referred to this committee, have been accepted by Prof. Lloyd and in part also by Prof. Charles T. P. Fennel, from both of whom there are to be reports at this meeting in Baltimore. The investigation of Prof. Lloyd has been confined to the question of the pharmacopœial limitation of starch; on this question the experimentation has been thorough and conclusive, and the recommendations are complete for the text of the pharmacopœia. The work of Prof. Fennel has been upon the contents of oils, fixed and volatile, as concerned in pharmacopœial requirements.

Certain questions of pharmacopœial standards referred to Prof. A. B. Stevens by this committee, will be reported on by him to the Committee on Revision of the Pharmacopœia, of which he is a member.

The Periodides of the Alkaloids, and Volumetric Methods of Assay by Iodo-Potassium Iodide.—In this subject work has been continued by Dr. H. M. Gordin with A. B. Prescott. It has been found that the higher periodides of the alkaloids, those obtained when the iodine is in excess throughout the precipitation, are constant in composition. If the alkaloids form more than one periodide, as do most of them but not all, it is only needful to add the alkaloid solution to the iodine solution in suitable dilution of each. For Atropine, Strychnine, Brucine, Morphine, and Aconitine, the analysis of the (higher) periodide precipitate has in each case given constant figures. From the composition of the precipitate so obtained, a volumetric factor is calculated, and this factor proves true in sharp results of volumetric control analysis.

In order to have the method put to trial by analysts as soon as may be, the first two of the following numbered papers have been published. The third named, covering the subject so far, is offered at the Baltimore meeting. Work has been done on emetine, but is not complete, the question of pure alkaloid being a cause of delay.

I. Atropine Periodides and Iodomercurates. (1) Atropine enneaiodide, (2) Atropine mercuric iodides, (3) Atropine estimation as a periodide.—Jour. Am. Chem. Soc., xx. 330.

II. A Volumetric Assay of Opium. (1) Morphine tetraiodide and its analysis, (2) Verification of the volumetric factor upon morphine solutions of known strength, (3) A percolation process for the extraction of morphine from opium, the alkaloids first being set free by ammonia with certain solvents, the powder being then percolated by benzol, lastly percolated with acetone for morphine, which is purified by solution in lime water, and then estimated as tetraiodide. The assay is made upon one gramme of powdered opium.—Phar. Archives, i. 121.

III. Volumetric Estimation of Alkaloids as Periodides. (1) The periodides in general, (2) the higher periodides in constancy of composition, (3) atropine enneaiodide, (4) strychnine heptaiodide, (5) brucine heptaiodide, (6) morphine tetraiodide, (7) aconitine triiodide, (8) atropine iodomercurate, (9) volumetric procedure, (10) confirmation of the iodine factors, (11) as to application in assay, (12) results in assay of opium.

The application of the periodide method to opium was not in our plan, but offered itself in a way tempting a trial. It is too early, as yet, to make definite proposals for the pharmacopœial use of the method for any of the alkaloidal drugs or galenicals, but the processes are at the service of analysts.

The Deodorized Tincture of Opium has been accepted by Prof. E. L. Patch for the investigation of a proposed method, as an inquiry of the Committee on Revision of the Pharmacopœia in this Association. His report, offered at this time, presents exact quantitative determinations of the results of the more important solvents for this process, and will be an authority upon the relation of opium to these solvents.

In the organization of this, the Special Committee of Research in the Section on Scientific Papers (Research Committee D., Section 2, in Committee of Revision and Publication of the Pharmacopœia), in 1897–98, the members are Messrs. Lloyd and Prescott for *one* year, Dr. Dohme for *two* years, Dr. Lyons to fill a vacancy in 1897–98, and Messrs. Rice and Kremers *ex-officio*. Election by the Section is therefore to be made at this time, to fill the places of Messrs. Lloyd and Prescott in expiration of their terms.

ALBERT B. PRESCOTT.

July, 1898.

It appears desirable to add to the preceding report a record of the work done by that section of Research Committee D. which was under the immediate direction of the undersigned, so that those who are interested in pharmacopœial revision may find the subjects in one place together. The following investigations were carried on at the request of the undersigned by Mr. Carl E. Smith, Ph. C., at the laboratories of the College of Pharmacy of the City of New York, under the assistance and advice of Prof. Virgil Coblentz:

1. Testing of Formaldehyde. Published in *Amer. Journ. Pharm.*, Feb., 1898.

2. On the Assay of Belladonna Plasters, and the alkaloidal strength of the Belladonna Plasters of the market. *Ibid.*, April, 1898.

3. Comparative accuracy of titrimetric and gasometric Methods of Estimating Hydrogen Dioxide in presence of various Preservative Agents. *Ibid.*, May, 1898.

4. Examination of commercial samples of Amyl Nitrite and Spirit of Nitrous Ether, and a new method for their valuation. *Ibid.*, June, 1898.

5. Valuation of Crude Carbolic Acid. *Ibid.*, August, 1898.

6. Crude Caustic Soda sold in the market as Crude Caustic Potash. *Ibid.*, August, 1898.

It is a cause of great satisfaction to the Committee of Revision that great interest is shown by competent original workers and investigators in problems which will confront the next revisers of the United States Pharmacopœia. In view of the results obtained, the committee has reason to feel amply justified at its action in having made a liberal appropriation towards the expense of these investigations, and there is no doubt that this policy will be continued in the future as long as useful results are obtained, and funds are available for such purposes.

CHARLES RICE,

NEW YORK, *August 1, 1898.*

MINUTES

OF THE

SECTION ON EDUCATION AND LEGISLATION.

FIRST SESSION.—FRIDAY MORNING, SEPTEMBER 2, 1898.

Chairman James H. Beal called the Section to order at 10 o'clock a. m.

THE CHAIRMAN: I regret to announce the unavoidable absence of our Secretary, Mr. H. G. Webster, of Minneapolis. It will be necessary for us to elect a Secretary *pro tem.* I shall be pleased to entertain a motion to that effect.

Mr. Helfman, having been nominated for temporary secretary by Mr. Werner, asked to be excused, and Mr. A. B. Stevens was, on motion of E. H. Bartley, duly seconded, elected to fill the position.

Dr. Whelpley was invited to take the chair while Mr. Beal read his address, as follows:

CHAIRMAN'S ADDRESS.

THE REFORM OF PHARMACY BY LAW.

It has not been uncommon of late years to learn from various sources that dispensing pharmacy has about reached the end of its existence as a separate calling, and that forces are now at work which must produce its speedy disintegration, and eliminate it from the list of recognized occupations whereby men may gain a livelihood.

The question which this prediction suggests is one of supreme importance and may well challenge our serious consideration.

Are we the remnants of a decaying cult, the leaders of a forlorn hope engaged in the desperate defense of a lost cause? Are we endeavoring to perpetuate a science and art which has outlived its usefulness, and which, despite all efforts ro the contrary, is destined to extinction simply because society has no further need of its services?

Some indeed have reluctantly accepted this mournful conclusion as true, and have advised that we set our professional households in order and prepare to make our exit gracefully. Others less easily discouraged anticipate that our art will again emerge from its present depression, and will again demonstrate its right to existence and its ability to render valuable service to mankind.

Whichever conclusion be correct, it is important that we early recognize it, and govern ourselves accordingly: if our calling is no longer necessary to society, that we may not uselessly put ourselves in the way of progress and waste our efforts in a fruitless contest with the inevitable; if it is destined to a regeneration, that we may be prepared to do our part in the work of transformation and hasten the day of its final accomplishment.

That dispensing pharmacy is at present in a very unsettled and unsatisfactory condition is a point upon which there is entire unanimity, but as to the causes of this condition or as to the remedies which should be adopted for its improvement, there is a wide difference of opinion.

Within the United States there was, until a comparatively recent date, absolutely no legal restriction upon the character of those who might engage in the sale of drugs and medicines, and assume the awe-inspiring title of pharmacist and chemist. Not only were there no laws npon the subject, but there was an almost entire lack of that public opinion which may frequently take the place of law. It was quite generally assumed, both inside and outside of pharmacy, that "any one could run a drug store," and that about the only qualifications necessary were some degree of familiarity with the table of apothecaries' weight, a slight acquaintance with the superficial appearance of the more common drugs and chemicals, and the ability to interpret the abbreviated titles of the shop bottles. Indeed, it is not too much to say that very many of those engaged in the business at that period could not boast of possessing even these moderate accomplishments in perfection.

A calling which is not careful of its reputation will not long have a reputation worth caring for. When those who were engaged in pharmacy placed so low an estimate upon their vocation, it was not surprising that the public took them at their own appraisement, and at length came to regard the "drug business" as a species of merchandising which differed from ordinary commercial ventures only in involving less risk and investment, and in paying larger profits; and as a business of this sort has an irresistible attraction for the average American, the ranks of pharmacy were speedily crowded by men unfitted for it by inclination, ability or training, and attracted solely by desire to share in the fabulous profits attributed to it by common repute.

Of course, there never has been a time when a large portion of American pharmacists have not been intellectually and morally the peers of any who were engaged in any other calling, men who clearly foresaw the demoralization which was coming over pharmacy, and who struggled against overwhelming odds to arouse public sentiment and procure restrictive legislation. To the efforts of these we as pharmacists owe what has been saved from the wreck of our profession, and to them the public owes the tolerable measure of protection which it now enjoys; but unfortunately before this restrictive legislation could be obtained the number of so-called pharmacists had increased much beyond the actual necessities of the population, many of them entirely unfit to handle drugs and medicines, a constant menace to the public health, and a disgrace to the calling which they assumed to follow.

Perhaps all of the measures of reformation which have been suggested have a germ of usefulness in them, some possibly more than a germ: nearly all are fatally defective, either from being based upon a too narrow or too superficial view of the situation, or because the remedies which they propose are not in harmony with natural and economic laws, and are therefore futile.

Of the various plans which are advocated, the reformer by act of legislature is easily first in the vehemence with which he insists that his is the only true plan of procedure, and that all pharmaceutic ills can be cured by a revision and extension of the law.

The advocates of this theory argue that since the demoralization of pharmacy was largely the result of a lack of legal restriction, it should be possible by the passage of new laws of greater comprehension and of increased severity, to reverse the process and bring about a reformation. This, however, does by no means follow. To check the development of an evil by timely legal enactment, and to uproot that evil by law after it has grown deep into the manners and customs of a people, are quite different things. The first has sometimes been done, the second we believe has never yet been successfully accomplished.

That a properly-constructed pharmacy law, wisely interpreted and honestly enforced, is capable of accomplishing great good, is an opinion which we cordially endorse; but that it is possible to reform the practice of pharmacy by legislative fiat, is a conclusion opposed to both reason and experience.

Active, useful legislation is but the formal expression of public opinion. The only effective law is that which has overwhelming public sentiment back of its enforcement; and any legislative enactment which is not thus supported, is law in name only. To this rule pharmacy laws are no exception.

Moreover, laying aside the impossibility of reforming society by legislative enactments, the fundamental principles of constitutional jurisprudence forbid invoking the powers of the legislature for the purpose of advancing the interests of a particular class or trade.

The only sound justification which can be alleged in support of pharmacy laws is their necessity to the public and general welfare. If they do not seek and support this end, then they are void under every constitution in the Union.

In the absence of statutory prohibition, every citizen has the same right to sell drugs as to sell agricultural products; the same right to dispose of his services in the treatment of disease as to dispose of them for any other purpose. Any restriction upon the sale of his possessions or upon the disposal of his services, is an interference with his natural rights; and the only ground upon which such interference can be permitted, is the necessity of protecting the public welfare. Even in securing this laudable end, the Legislature cannot arbitrarily exclude certain persons from an occupation or extend the privilege arbitrarily to certain others. The most that it can do is to prescribe a reasonable standard of proficiency which must be possessed by those who exercise a given employment, and then leave the way open for any citizen to acquire that proficiency and to engage in that employment, if he so desires.

It is true that pharmacists sometimes carelessly speak of the necessity of protecting their calling against invasion, but this expression is only an unfortunate figure of speech which cannot be too quickly banished from the vocabulary of pharmacy. Such thoughtless statements give color to the claim of many people, that pharmacy laws are class legislation, and an attempt to create a monopoly of drug sellers; a belief which is, unfortunately, shared to some extent by the courts who are called upon to construe the statutes.

What the pharmacist refers to when speaking of protection is the inequity of requiring him to qualify by examination and to pay an annual tax for the support of the pharmacy laws, while others are permitted to engage in substantially the same business without qualification and without tax. The pharmacist has an undoubted right to object to such unjust discrimination, and to demand that the law which applies to him should apply to all others; but he should be careful to make his demand in terms which will express his real meaning, and which will not place him in apparent conflict with rational jurisprudence.

THE PROPER FUNCTION OF THE PHARMACY LAW.

In addition to fixing the competency of the pharmacist, the law may also prescribe reasonable regulations for the exercise of his business. It may, for example, prohibit the employment of incompetent help, forbid the sale of intoxicating liquors, or of narcotics and articles intended for immoral or criminal purposes, require the labeling of poisons, the registration of their sale, etc.

With these subjects provided for, the proper function of a pharmacy law is exhausted. Having secured the safety of the public by requiring the pharmacist to be competent, and to conduct his business in a proper manner, the law has accomplished all that it can or ought to do. The pharmacist cannot expect favors from the legislature, and, if he is wise, will not ask for them. The prosperity of pharmacy as a specific calling cannot be considered by the law, and the success or failure of those who are engaged in that occupation is a matter which must be determined by their individual capacities, by their abilities to adjust themselves to the changing conditions of society, and by the law of supply and demand. Wise legislation will undoubtedly benefit the pharmacist indirectly, and as a patriotic and public-spirited citizen, he should join in obtaining such legislation; but the great reform in pharmacy which we hope for will depend more upon our knowledge and application of natural and economic laws than upon any which may be passed by the general assembly.

While we believe it to be impossible to reform the practice of pharmacy by legislative enactment, nevertheless a properly constructed law is an important factor in the working of such a reformation; and in the writer's opinion this Association can perform no more important service than in formulating and disseminating correct ideas upon this subject, and especially in combating certain erroneous notions, which, if they should be enacted into law, would not only fail to reform pharmacy, but actually postpone its reform for years to come.

LIMITING THE NUMBER OF PHARMACIES BY LAW.

One of the changes proposed in some quarters is that the number of pharmacies should be limited by law according to population, a proposition which is utterly impossible to realize under our present system of constitutional government. Such a law would be class legislation of the clearest type, and in absolute opposition to the principle that a pharmacy law is not to protect the pharmacist, but to restrict him, and to protect the public. Even should the American people consent to change a fundamental principle of their governmental system for our especial benefit, we would speedily find that, in obedience to the inexorable law of supply and demand, the franchise of a business protected by law against competition would be valued at such a figure that the profits could pay the purchaser only a small income on his investment. As a consequence, the only person who could be benefited by such a law would be the fortunate owner who chanced to be in possession of the business at the time when the monopoly was created. The folly and impossibility of such a proposition is so apparent that we need hardly give it serious attention.

TWO CLASSES OF PHARMACIES.

Another proposition which has been pressed with some vigor by certain writers on the pharmacy laws, and which has rather more to commend it than the preceding, is that the law should create two classes of pharmacies, to be in charge of licentiates of corresponding grades. To the pharmacist of the lower grade would be permitted the sale of a limited line of the less active medicinal agents, and of the more active substances when sold in unbroken packages only. To the other, or pharmacist of the first class, would be granted plenary powers to compound and sell medicinal agents of every sort.

For this division of pharmacists into classes having different degrees of qualification and possessed of different powers, we confess our inability to perceive any good or sufficient reason, and believe that the experience of European countries where such a division has been tried argues more strongly against than in favor of its introduction into the United States.

In the first place we deny the truth of the alleged principle upon which such a separation is based, namely, that a man may safely be permitted to conduct a store for the sale of moderately poisonous drugs, who could not be trusted with the sale of those which are dangerously poisonous. We contend that if a man is competent to dispense a drug the maximum dose of which is twenty grains, he is also competent to dispense one of which the maximum dose is the one-twentieth of a grain. If he is not competent to dispense the one, he is likewise incompetent to dispense the other.

The fact whether a candidate for registration is or is not competent, depends upon whether he has or has not received competent training in the art and science of pharmacy, and not upon his recollection of doses. Modern pedagogics makes a distinction between education and the mere possessing of information. One is the result of training and culture, the other of memory. Mere information makes the traditional learned fool; training makes the scholar. The man who is well trained in the general and particular principles of pharmacy, will make a safe pharmacist whether he is thoroughly posted on doses or not. The untrained man will be an unsafe pharmacist even if he should know the dose of every drug in the Dispensatory.

We can perceive no better reason why there should be a difference in the educational qualifications of pharmacists than that there should be a difference in the educational qualifications of attorneys and physicians. The education of each should fit him to serve the public to the fullest extent within the line of his occupation. Each should be educated not merely to the lowest permissible, but rather to the highest possible limit; not that he may barely reach the technical requirements of an examining board, but that he may possess a liberal margin of safety over and above such requirements.

Furthermore, if such a division of pharmacists were made, we submit that it would be practically impossible to prevent the constant infringement of the lower class upon the prerogatives of the higher class. Consequently the separation of functions would exist in name only, and fail in achieving the first great object of the pharmacy law, namely, in securing the public safety.

Finally, we have already with us the first or lower class of druggists in the dealers in general merchandise, who are now permitted to sell non-poisonous drugs, and we are opposed to giving them official recognition even as pharmacists of the lowest degree. Our efforts should be to procure the restriction of the sale of all medicinal articles to competent hands, and not to still further increase the ranks of the incompetent.

We believe that the present popular division of licentiates into pharmacists and assistant pharmacists satisfies every practical requirement. The first only may be the responsible head of a pharmacy, and the second may sell medicines only when in a pharmacy under such management. This division is already in existence in twenty-eight States, and has been found to work very satisfactorily in practice.

We would favor, however, an important change in the law regarding registration, namely, that every applicant should be required to first register by examination as assistant pharmacist, and to remain on the rolls as assistant for two or more years before coming up for registration as pharmacist. Besides other important reasons for the requirement, this compulsory registration as assistant is the only feasible way of enforcing a proper period of experience for those who wish to become managers and owners.

The point is often made that the same degree of education should not be demanded in a pharmacist doing business in a village or country place as in the case of those in the larger cities. Logically it would seem proper that the health and lives of the rural population should be as carefully looked after as those of the dwellers in cities. However, if it is practically necescary to make some concession to the rural districts, there might be inserted in the law permission for the boards of pharmacy to grant minor certificates to responsible persons resident in small places to sell a specific list of articles, or to grant assistant pharmacists the right to conduct stores for the sale of such articles, these permits to be granted only in localities where there are no pharmacists within convenient distances.

GRADUATION A REQUIREMENT FOR REGISTRATION.

Another most important point which the law must consider is the degree of competency which should be demanded from candidates for license as pharmacists. Notwithstanding the number of splendid colleges of pharmacy which we possess, the general standard of admission to the practice of pharmacy in the United States is below that of Great Britain, Ireland or Canada. While we have many American pharmacists who are the peers of any in the world, it is a lamentable fact that there are on the registers of the various State Boards a vast number who are woefully incompetent. A large number of these were in business at the time of the passage of the laws, but many more have been admitted through too great laxity in the examinations. As the laws, with but few exceptions, permit the Boards to fix their own standards, these official bodies have received general criticism for their failure to make their examinations severe enough to exclude the unfit. In their behalf, however, it should be remembered that whenever they have increased the severity of the examinations they have invariably been met with the outcry that raising the standard of admission to pharmacy would raise the wages of drug clerks, the objectors apparently forgetting that it is the abundance of cheap clerks which has caused the enormous multiplication of cheap drug stores with which they must compete.

On account of the opposition which will always be made to any independent action of the Boards of Pharmacy in raising the requirements for admission, we believe that the law itself should set the standard, and that this should be nothing less than graduation at a reputable college of pharmacy.

We are aware that many excellent pharmacists are not in harmony with this idea, and contend that the education which was good enough for them is good enough for their clerks. Those who use this argument apparently overlook the fact that the educational value of store experience at the present time is very greatly below what it was a quarter of a century ago. Moreover, education in other professional lines has advanced so rapidly that nothing less than a college training will enable the pharmacist to obtain and hold that respect of the public which is absolutely essential to his professional and financial success. Certainly it would be greatly to the advantage of their patrons if future pharmacists should all be college graduates, and we believe it would be equally to the advantage of pharmacy.

We also believe it to be almost if not altogether demonstrable that the esteem in which a vocation is held by the community, and the consequent honor and profit attached to its pursuit depend more upon the character and education of the men who are engaged in that vocation than upon any other single factor, or perhaps more than upon all other factors combined.

Of all the influences which may operate to improve the condition of pharmacy in the future there is none so important, in our opinion, as the thorough education of the rank and file of pharmacists—an education not merely in the contents of the Pharmacopœia, but, in the broadest and most liberal sense, a training which will help the future pharmacist to comprehend the relation of his profession to society, and of his individual responsibility to both, which will enable him to adjust himself to the changing conditions of civilization, and to discover new outlets for his services. In short, an education which will lead him to no longer set himself in opposition to the laws of progress, as he has so often done in the past, but rather to acquaint himself with those laws and make them serve his purpose.

That graduation will at some future day be an essential for registration is doubted by few who have carefully studied present tendencies. The only difference of opinion seems to be as to the time when this reform should take place. Some say now; others, twenty years from now. The sensible thing for us to do is to take up the agitation and to continue at it until we have convinced both the public and the body of pharmacists of the necessity of a higher educational requirement, and have secured its enactment as a part of the formal law of every state in the Union.

POSSIBILITY OF SECURING APPROPRIATE LEGISLATION.

Lack of time forbids the discussion of many other features of the pharmacy law deserving of attention, but we would like to refer to the possibility of securing appropriate legislation in the several states.

One of the prerogatives of the American citizen is the right to grumble at the Legislature, a trait, by the way, which we seem to have inherited from our British ancestry; but as there are about fifty times as many legislative bodies in this country as there are in

Great Britain, we have to do a proportionately larger amount of grumbling. As pharmacists, we have exercised this right quite liberally, and have been free with our criticisms of the legislatures for what they have or have not given us in the way of pharmacy laws. Candidly, however, very much of this criticism has been undeserved. As a rule, our State legislative assemblies are composed of high-minded, honorable men, and are desirous of enacting the best possible laws; and when they fail in this respect, it is generally because they have been misled by the persons to whom they have looked for information. The fact that we have not better pharmacy laws in the United States is chargeable more to the indolence and apathy of the pharmaceutical body than to the contumacy of the law-making bodies. It is the writer's belief that there is not a State in the Union where the enactment of a fairly good pharmacy law cannot be procured by determined, united effort on the part of the pharmaceutical profession. If the pharmacists of a State will unite upon a reasonable measure, one not too revolutionary in character, which does not ask for too much at once, which does not interfere with constitutional rights, and will then take the pains to inform the members of the Legislature individually as to the merits of the bill, their efforts will almost invariably meet with success. The main work in every case is to convince the individual members of the General Assembly of the honesty and propriety of the measure advocated. This accomplished, the remainder of the task is comparatively easy.

In conclusion, we do not share the belief of those who hope to reform the practice of pharmacy by law. The law is one of the important factors of the reform, and as such should be carefully studied and applied, but there are other and more important factors still.

The present conditions of pharmacy are the outgrowth of a century of a mistaken policy, and cannot be changed in a day or a year. They must be modified by a continuation of the process through which they came into existence—by a process of slow and gradual evolution. In this, however, we can borrow a method from the horticulturist, and hasten the operation by bringing intelligent artificial selection to the aid of natural selection. To point out the favorable variations and perpetuate them, to discover the unfavorable and eliminate them, to prevent the taking of backward steps, to avoid development along lines which are too narrow or which do not promise tangible results, these, it seems to me, are the principles which should direct our efforts.

Whether we will it or not, the evolutionary process will go on. Protests will avail us nothing. We can hasten or we can retard, but we cannot stop its operation. The struggle for existence among pharmacists, already keen and fierce, will become keener and fiercer. Nature punishes ignorance and weakness quite as sternly as crime. Those of us who are unable or unwilling to adjust ourselves to surrounding conditions, to harmonize with environment, will be crushed and eliminated from the contest. Only the strong and intelligent will survive. This is as it should be.

Many have tried for ages to control the operation of economic laws by legal enactments and to force trade into artificial channels, by trade combinations, by associations and by unions. They never have succeeded, and they never will.

If pharmacy can find no better means than these by which to perpetuate itself, then it will perish from the earth. Unless the pharmacist can render the public a service which it cannot perform for itself, and perform it better and cheaper than any one else, the public will not avail itself of his services. Unless the pharmacist can make himself useful to the next century, the next century will have no use for him. And as the coming generation is no more likely to continue the use of the drugs and treatment of the present than it is to wear clothes of the same fashion, it is important that the pharmacist be on the alert to anticipate and supply these new wants. If he shall sit idly by, as he has so often done in the past, and permit others to supplant him in this service, he will both invite and deserve the extinction which is sure to be his.

Nevertheless we are not of those who despair of the future of pharmacy. We believe that what appears to us as chaos is merely the disorder attendant upon a new arrangement of things, just as confusion of brick and mortar attends the conversion of a street of ancient tenements into one of modern business blocks. It is the transition period, when the old has lost its shape and before the new has appeared. Out of the present shapelessness we expect to see the new arise on more substantial foundations, of more significant proportions, a nobler fabric, and a fitter temple for the spirit of progress which typifies the age.

Prolonged applause followed the reading of the address.

DR. WHELPLEY: We have been united in close attention to this clear expression of ideas on Pharmaceutical Education and Legislation. The document is now before you for action. What is your pleasure?

MR. SAYRE: I move that it take the usual course—that it be received and referred to the Committee on Publication.

The motion was seconded and carried.

After an animated discussion, participated in by Messrs. Sayre, Whelpley, Sheppard, Lowe, Helfman, Beal and Thompson, as to the desirability of requesting the Association to have reprints of the Chairman's very excellent address made for the benefit of the drug trade of the country, it was decided to accept the offer of the representatives of pharmaceutical journals present to print the address in full with editorial comments.

MR. REMINGTON: I do not think there has been work of much greater value to this Association in its history than that which Prof. Beal is doing in the matter of pharmaceutical legislation, and I hope the time will come—in fact, I am not sure but that this would be a good time—when this Section can recommend to the Council of the Association the propriety of making a special department, and a special reporter each year, on the subject of Legislation; and I hope to see Prof. Beal given that position, so that each year we may have a complete resume of all the work done on legislation. It will be of practical service to every druggist in the United States, and it will come to be a great feature of our Association. I want to explain that this is not my idea, however; Mr. Sheppard, I think, originated the plan. I mention it now because the iron is hot, and this is the time to strike. If this Section would recommend to the Association the creation of a special reporter on the subject of legislation, it would be advisable, in my judgment. Prof. Beal has made a special study of the subject, and has done more along that line than anybody has ever done in the Association.

MR. REDSECKER: It was my good fortune to have been Chairman of the Committee on Legislation when we got our pharmaceutical bill through ten years ago, and I want to say that the Pennsylvania legislature has not the most savory name. But that legislature did not make us expend one dollar to secure the passage of the bill, and I agree with Prof. Beal on that point. We talked to them and endeavored to explain the bill, and although we did not get everything we wanted, we got a great deal that we did want. We had to concede some things, however. For instance, we had to concede an exemption in favor of country doctors being allowed to compound their own prescriptions. But we waited about four years and then captured the State Medical Society, and got them to condemn that section of the law; and the next year we went before the legislature and had them amend the bill.

And I commend another matter, and that is that we should now believe in the higher education of pharmacists, and incorporate in our next pharmacy law a provision that none but druggists and pharmacists who have had an actual experience of at least four years, and graduated from an accredited pharmaceutical college, shall be registered as pharmacists in the State. I am glad to see that brought out.

My friend "Uncle Charlie" and I are going to leave this hot city, and if you will permit me in this discussion to incorporate in my remarks a little bit of a scientific paper, I will be glad to do so, and then retire:

O, tell me, ye hot waves
  That round my pathway soar,
Is there not some secluded spot
  Where heat is known no more?

Some cool and shady nook,
  Or Klondike, with its ice,
Where druggists, heated through and through,
  May cool off in a trice?

In mockery the hot waves spoke:
  "Go search, and though you try,
You will not find a cooler place,
  So just stay here and fry."

(Laughter and applause.)

Mr. Arny: If in order, I should like to comment on that part of the Chairman's address relating to need of legislation demanding a college diploma as prerequisite to registration, with a view of calling special attention to recent legislation in this line in Louisiana. To my mind this legislation is the most important that has occurred in pharmacy since the framing of the first pharmacy law, as it was the first attempt, to my knowledge, to persuade an American legislature to pass a bill demanding a diploma as a requisite to registration; and, while given much publicity by the pharmaceutical journals, their reports are apt to create a misapprehension as to the cause of the defeat of the measure. Passed by the House and Senate of the Louisiana Legislature, the measure was vetoed by the Governor, because of his objections to a clause allowing the issuance of permits to country storekeepers, such permission being construed by him as class legislation. I desire particularly to emphasize the fact that the defeat of the bill was not due to the diploma requirement clause; in fact, the promoter of the bill, Mr. F. C. Godbold, informs me that this very clause was the most popular feature of the proposed law. I cite this because the stock argument against this marked feature of pharmaceutical advancement is that such a radical measure could never pass a legislature. The experience in Louisiana disproves this assertion.

Mr. Sheppard: It seems to me that this paper of our Chairman deserves much more than ordinary discussion. It shows a force of conception that indicates leadership—it shows guidance along great lines. Coming events cast their shadows before, and the strong men—the leaders—are those who see these shadows and point the way; recognizing the fact that it is useless to combat the inevitable, but that it is the province of intelligence to strive to guide a movement rather than to combat it. I would call attention especially to two points in Prof. Beal's address that it seems to me are directly along these lines. I think that every one must recognize that there is a movement in pharmacy toward eliminating the commercial side of our business. This is specially illustrated perhaps in this city, more than in any other place, in the store of our local Secretary, Mr. Hynson. It is also illustrated in Chicago and other places—shadows that go before. The mercantile side of this business is going. Our Chairman says that efforts are being made to have two classes of druggists, and he objects to that as being in the wrong direction. I think he is right. The mercantile side of this business is going into the large department stores. I think that is one of the inevitables, and it is useless to combat it. But there is going to be left to us the better part of the business, and that is the professional (the scientific) part of it, which all here will recognize. We are to have one class of pharmacists, and that of a scientific character, and we should strive to influence legislation and strive to guide the laws in our several localities in recognition of that fact. I think that Prof. Beal is exactly right.

Another point in his address: Years ago—half a dozen at least, if no more—it would have been impossible for him to obtain much following on the proposition that a Board of Pharmacy should require graduation from a college as one of the prerequisites for eligibility. I think to-day a majority of intelligent, thoughtful men, who have given pharmaceutical legislation special study, agree with him. The time appears to have arrived, in our section, at least, for that movement to take shape. We want to recognize that, and prepare for it too. It seems to me that those schools, those worthless institutions, which spring up all over the country and grant undeserved diplomas, ought to be stopped in their vicious career. I think that is the point he gives. In fact, we may recognize in that paper many good points of interest and importance.

DR. WHELPLEY: We have a number of papers, some of which bear directly on the subjects mentioned in the address, and possibly some of the remarks made now will be still more appropriate when these papers are read.

Mr. Beal resumed the Chair.

The Secretary protem., Mr. Stevens, read the report of the regular Secretary, as follows:

REPORT OF THE SECRETARY.

LEGISLATION.

The past year has not been prolific in pharmaceutical legislation. Twenty states report no attempt at legislation. In most of these states, there were no sessions of the legislature. The following is a summary of reports from states where legislation has been attempted:

District of Columbia: Two bills were introduced in Congress to amend pharmacy law of the District, both of which failed to pass.

Georgia: Bill introduced to amend section 8 of pharmacy law by striking out exceptions to law. Failed to pass.

Iowa: A pure food bill, similar to the Ohio law, introduced in the legislature, but defeated. Bill to take away *entirely* from druggists the sale of liquors. Defeated. Bill requiring that druggists pay a license to sell liquors. Defeated. Bill with severe penalties attached for adulteration of linseed oil. Passed. Bill to compel the Board of Pharmacy to register, without examination, graduates in Pharmacy who had accomplished an amount of work equal to the work shown by announcement of the Iowa State University's Department of Pharmacy for the years 1897 and 1898. Passed. Bills were also passed further regulating the sale of liquor by pharmacists, but increasing rather than restricting their privileges to do so.

Kentucky: New law passed. The former law applied only to towns of one thousand population and upward. Present law covers the whole state.

Louisiana: A bill for a new law passed both houses of the legislature, but was vetoed by the governor. It is claimed, however, that the governor did not exercise his veto power within the time allowed by the constitution, and the law may yet prevail. The law is unique in many of its provisions, and should be carefully read by every student of pharmaceutical legislation. It certainly has some admirable features.

Maryland: Attempt to pass state pharmacy law failed.

Massachusetts: Poison laws amended. Bill introduced regulating the hours of labor for drug clerks. Failed to pass.

New York: Attempt to pass a one-board bill. Failed.

New Mexico: Pharmacy law amended to regulate the sale of poisons.

New York City: New law to include New York, Brooklyn, Queens and Richmond Counties.

New Jersey: Bill introduced to register persons on time experience. Failed to pass.

Oklahoma: New law passed.

Ohio: Pharmacy law generally amended and improved.

Rhode Island: Bill introduced, at the suggestion of the Board, to amend pharmacy law, but failed to pass.

South Carolina: Bill introduced to amend pharmacy law, so that physicians could register on their diplomas without examination. Failed to pass.

Virginia: Bill introduced to amend pharmacy law, but failed to pass. Nature of bill not reported.

The Secretary may be permitted to call special attention to the following facts:

That the States of Kentucky, Ohio, Louisiana, and the Territory of Oklahoma have either extensively amended their old laws or passed new ones. In each case there has apparently been marked improvement. Maryland has again failed to pass a State law. In one State the law was amended evidently in the interests of a local college of pharmacy, to secure the registration of its graduates without examination and with little or practically no experienee. This certainly is a step backward. No other antagonistic legislation is reported to have passed. The usual bill to register physicians as pharmacists was introduced in the legislature of one State, but failed to pass. The pharmacists of Rhode Island failed to secure needed amendments to their State law. The pharmacists of the great State of New York have failed to agree upon a bill for a law to cover the entire State, and to be executed by a single board. The pharmacists of New Hampshire desire to improve their law. Many are in favor of a law similar to that now in force in Massachusetts, but they could not agree upon a bill and nothing was done. One of the bills introduced in Congress for the amendment of the pharmacy law in the District of Columbia related to the sale of poisons and the refilling of prescriptions containing opium, morphine, cocaine and chloral. The character of the other bill was not reported.

NUMBER OF REGISTERED PHARMACISTS IN THE UNITED STATES.

From Board reports	63,583
Estimated additional (Wyoming, Idaho, Florida and under new laws in New York city and Kentucky)	1,700
Total	65,283

An increase over last year of 3,683.

NUMBER OF REGISTERED ASSISTANT PHARMACISTS IN UNITED STATES.

From Board reports	8,373
Estimated additional	350
Total	8,723

Decrease from number estimated last year, 1,764.

Persons registered as assistants under the old law in New York City are now entitled to register as pharmacists.

NUMBER OF PHARMACISTS REGISTERED LAST YEAR IN UNITED STATES.

From Board reports	2,523
Estimated additional	200
Total	2,723

Increase over number registered preceding year of 189.

Of the pharmacists registered last year there were registered:

By examination	2,021
On pharmacy diploma	152
A decrease from preceding year of 179.	
On medical diploma	61
An increase over preceding year of 5.	

Other causes, without examination.. 289
An increase of 70 over preceding year.

Some of these persons had passed examinations in other States; some were registered locally only; others were given full registration on experience only. In at least one State the law had been amended, giving persons originally entitled additional time in which to file their application; some had registered in this way.

STATE.	Total on rolls.		Registered last year. By exam.		Registration without examination.				Ph. G.'s on Rolls.	Women on Rolls.
	R. P.'s..	A. P.'s..	R. P.'s..	A. P.'s..	Ph. G...	M. D...	Other causes.	A. P.'s..		
Alabama	836	....	23	....	....	6	27			
Arkansas	935	....	11	....	2	....	....	....	....	2
California	1575	820								
Colorado	578	42	32	6	....	....	....	....	114	10
Connecticut	721	....	25	....	18					
Delaware	257	190								
District of Columbia	747	....	6	....	41					
Florida										
Georgia	1065	....	46	....	....	18	8	....	115	1
Idaho										
Illinois	4570	1325	166	233	....	....	38	49	....	118
Iowa	2834	12	208	12	....	....	....	....	....	65
Kansas	1381	63	58	17	18	....	....	1		
Kentucky	562	....	45	....	13	7	3			
Louisiana	999	258	41	11	....	....	7	....	....	9
Maine	511	31	36	8	....	....	....	....	....	12
Maryland (Baltimore)	430									
Massachusetts	3771	....	67	....	....	....	....	....	....	53
Michigan	3098	311	56	48	....	....	9			
Minnesota	1157	134	45	41	6	21	9	....	135	30
Mississippi	942									
Missouri	4000	....	184							
Montana	231	11	27	5	....	....	....	....	18	5
Nebraska	1444	....	32							
New Hampshire	608	69	31	10	....	....	....	10		
New Jersey	2562	41	84	19	....	....	27			
New Mexico	95	10	8	....	9	....	....	10	....	1
New York State	5222	224	149	27	....	....	137			
New York City	4372									
New York—Buffalo	245	61	7	15	10	....	2	6		
North Carolina	436	....	28	....	6	9	....	....	42	3
North Dakota	239	71	13	....	....	....	4	24	....	1
Ohio	3262	720	152	128						
Oklahoma	145	7	9	7						
Oregon	505	49	23	17						
Pennsylvania	6322	3130	193	184						
Rhode Island	228	165	1	28	....	....	....	....	....	3
South Carolina	250	....	15	....	1					
South Dakota	459	16	17	4	....	....	1	....	37	11
Tennessee	1228	154	34	11	....	....	511*	82*	125	18
Texas	1398									
Utah	229	36	12	13	1	....	....	....	27	2
Vermont	410	5	14	....	....	....	5			
Virginia	848	43	31	20	....	....	2			
Washington	472	64	22	14	17	....	2	....	....	17
West Virginia	600	....	33	....	10	....	....	....	143	6
Wisconsin	1268	373	71	78	....	....	8	....	....	40
Wyoming										

* On Experience.

There were 1,055 assistant pharmacists registered last year; 955 of these were registered by examination, most of the balance being registered on experience.

Referring to the above table of figures, it will be noted that the number of pharmacists registered last year was slightly in advance of the preceding year, but that the number registered without examination was less. Next year it will be necessary to record an increase in this class of pharmacists, as the new law in Kentucky will admit six or seven hundred, who have not registered heretofore; and the new law in New York City permits former assistants to register as pharmacists—this is all wrong, but it has been done in other States before. Every time a pharmacy law is amended, an attempt is made by some class of persons to secure full registration without passing an examination, and the greatest watchfulness and activity is necessary, on the part of progressive pharmacists, to prevent this letting down of the bars. As has been previously noted by the former Secretary of this Section, the number of registered assistants is disproportionately small to the number of pharmacists. There seems to be a feeling on the part of many young men, that they are looked upon as boys if they are registered only as assistants; and some Boards, probably all that return the whole examination fee, are annoyed by these assistants coming up for examination every time the Board meets. Quoting the expression of some of them, "to try and get past the Board," as though the Board were an obstruction in their path, to hinder them in attaining success and securing better wages. Most of these young men have attended some school of pharmacy, for a term or two, expecting to secure full registration at the Board examination. Failing in this, they return to work; but not keeping up their studies, they naturally continue to fail at each examination, often falling lower and lower in their standing. There is in some cases lack of general education, as well as properly-laid foundation at the commencement of their pharmacy studies—in other words, a lack of thoroughness—and it is necessary for them to go over the whole ground again before they can succeed in securing full registration.

H. G. WEBSTER, *Secretary.*

Mr. Thompson moved to receive the report and refer to the Committee on Publication. Carried.

THE CHAIRMAN: The next report is on American Colleges of Pharmacy—mainly of a statistical nature and prepared by myself. As we have some important papers for discussion, we will postpone this, without objection, until the next session.

The next paper is one by Dr. Whelpley, on the question of teaching the metric system in medical colleges.

Dr. Whelpley read the paper as follows:

THE METRIC SYSTEM IN MEDICAL COLLEGES.

BY H. M. WHELPLEY, M. D., ST. LOUIS, MO.

During the past fifteen years I have paid considerable attention to the work of introducing the metric system among pharmacists and physicians. I find that the doctors claim that a pharmacist cannot fill their prescriptions if written in the metric system, while the druggists say that the physicians are unable to write prescriptions in the metric system.

I have made no attempt to canvass the subject of teaching the metric system in colleges of pharmacy, for I believe that every American institution teaching pharmacy insists upon the students becoming familiar with the metric system.

In order to learn the extent to which the metric system is taught in the colleges of medicine, I sent a copy of the following letter to each one of the 154 medical institutions in the United States recognized by the Illinois Board of Health:

> *Dear Sir:* We are anxious to learn the extent to which the metric system is taught in the medical colleges of America. Will you kindly make use of the inclosed postal in answering the following questions, numbering your answers to correspond with the questions? Very truly,
>
> 1. Is the metric system taught in your college?
> 2. If so, are the students obliged to become familiar with it before graduation?
> 3. About how many, if any, of your teachers use the metric system in their regular practice?
> 4. Has your college ever taken any united action favoring the general use of the metric system in prescription writing?
> 5. Name of the college.

Unfortunately, these queries were sent out during the college vacation, and this fact undoubtedly accounts for the small number of answers received. Up to date 67 colleges have answered. A summary of the responses are as follows:

Question No. 1. 51 out of the 67 colleges answering are teaching the metric system. One college says, "Of course we teach it." Another, "Most certainly." While 16 colleges answered "No;" of this number several are homeopathic institutions.

Question No. 2. 43 of the 67 colleges answering state that students are obliged to become familiar with the metric system before graduation. One institution says "We enforce the rule under difficulties." Another, "We fear that a few students slip through without being familiar with the system."

Question No. 3. 4 of the 67 colleges answering state that all of their teachers who are practicing physicians use the metric system. 25 colleges say that some of the teachers use it, while 18 say that not one of their teachers writes metric prescriptions. Several other colleges answered that homeopathic physicians do not write prescriptions.

Question No. 4. No united action has been taken by the teachers of any medical college among the 67 answering to favor the general use of the metric system in prescription writing, further than is done by teaching it to the students. One college answers that it may soon take further action favoring the metric system.

From this report I judge that the metric system is taught in nearly all of the medical colleges, but fear that the members of the faculty fail to use it in prescription writing, or impress upon the graduates that it is a practical and convenient as well as scientific system of weights and measures. Some colleges seem to teach it out of a sense of duty rather than from belief in its utility. I suggest that the members of the American Pharmaceutical Association living in the vicinity of medical colleges and acquainted with the teachers, take pains to impress upon such physicians the importance of using as well as teaching the metric system.

THE CHAIRMAN: Unless there is objection, the paper will be received and referred, and is now open for discussion.

MR. RYAN: In connection with that paper, I would like to say that I am glad Dr. Whelpley has presented it; first, from the statistics it gives, and second, because it relieves me from some personal work I had laid out to do this winter on exactly the same line.

In regard to the charge made by physicians that pharmacists are not equipped for the use of the metric system, I want to say this: The Secretary of the Erie County Pharmaceutical Association, including the city of Buffalo, sent out one hundred and fifty postal cards to members, asking if they were acquainted with the metric system, and how many of the last one hundred prescriptions filled by them had been written in the metric system, and this was the result: 71 cards were returned; 60 of the 71 had full sets of metric weights andmeasures; 7 had none; 2 had partial sets, and 2 did not reply to this portion of the question. The report on the last one hundred prescriptions, 71 being returned, made 7,100 prescriptions, and of these 769, or a trifle over 10 per cent., were in the metric system. One druggist replied that his last 100 prescriptions had all been written in the metric system. An investigation took place, and he was found to be a Polish druggist, handling all his prescriptions from one Polish doctor, who wrote all his prescriptions in that system.

In connection with the teaching of the metric system in medical colleges, I had a peculiar experience with a Professor of Medical Therapeutics, who asked me to come and give him some instructions in the metric system—that he wished to teach that system wholly in the college where he was located. I called one evening to explain the matter, and he said to me, "How do you expect us to teach the metric system?" I said, "It is a matter simple enough." "But how do you expect us to accomplish this?" he said, and taking down the Pharmacopœia he turned to the table of equivalents and said, "Do you expect that I can ever learn and remember all these equivalents in all these pages?" I said, "No; I do not think it necessary." I gave him such instructions as I thought would be useful, and in a half hour's time I convinced him that it was the simplest and easiest thing he could use; and I am glad to say they are now using the metric system in that institution. It is a simple misconception in regard to this matter.

MR. FEIL: The Association of American Medical Colleges requires one year of physics before a student can enter, and a knowledge of the metric system is necessarily presupposed. Nearly every high school in the United States uses the metric system, and the graduates of these understand the system.

DR. ECCLES: I will state that for a considerable time, in the American Medical and Surgical Bulletin, I put in all articles in the metrical system alone. All of my abstractors were directed to put it in that way. But our subscribers soon objected, saying they did not understand the system, and finally I gave orders that all abstractors should do their work and give both systems, and since that time they have been doing it in that way.

DR. WHELPLEY: The members will remember that last year I gave a report on a number of prescriptions filed, showing the percentage of metric system prescriptions in the last one thousand in each case. I have continued that work, calling on other pharmacists than those reporting last year, so that the report I have here may be considered a continuation of the former report.

Dr. Whelpley then read the following:

STATISTICAL REPORT ON THE USE OF THE METRIC SYSTEM.

BASED ON 307,000 PRESCRIPTIONS.

BY H. M. WHELPLEY, M. D., ST. LOUIS.

Since the 1897 meeting of the American Pharmaceutical Association, I have continued the work of gathering statistics on the use of the metric system in prescriptions. In each case the pharmacist reports the number of metric prescriptions in the last 1,000 prescriptions on his file. While the report this year covers about the same States and Territories as last, and in many cases the same cities and towns, the statistics come from prescription files not reported upon last year, so that these figures can be considered as a further report upon the subject.

Three hundred and seven pharmacists have responded. They represent 216 cities and towns, and are scattered throughout thirty-four States and Territories. A greater number than last year report that all of their prescriptions are written in the metric system. The general average based on the entire report is 6.01 per cent. of metric prescriptions. The average reported last year out of 233,000 prescriptions was 6.27 per cent. of metric prescriptions. Averaging the two reports, we find that 540,000 prescriptions average 6.14 per cent. of metric prescriptions. I omit a detailed report, and refer parties interested in the method to pages 303 and 304 of the American Pharmaceutical Association Proceedings for 1897.

DR. WHELPLEY: In answer to Prof. Feil's remarks, I will say that it is true, the metric system is taught in the high schools—taught and learned just as many other things are—but it is not taught in a way the vast majority of graduates can use it. In fact, it seems to be taught by rote, just as history and other branches frequently are—not only in our high schools, but in our best universities. I recently had an experience with three graduates from universities. They said they were perfectly familiar with the metric system, and were, when examined in writing, in a certain way, but not practically. Upon a practical examination, two of them gave up entirely and admitted that they could not keep up with the ratios in that system—could not use it in every-day practice. This led me to think about the best method for familiarizing students with the metric system, and this is what I followed: Wherever possible, I have induced students to secure metric weights and two or three metric graduates and a rule, and use them constantly whenever possible, taking the rule and seeing how many centimeters or millimeters a certain object is long; to use them at home, in their boarding houses, and in their families. Some of them use a certain number of grammes of sugar in so many cubic centimeters of coffee. They weigh out a certain number of grammes of salt and sprinkle over their potatoes. (Laughter.) And in that way, in a few weeks' time, they become more familiar with weighing the quantities, either solid or liquid, or the measures of linear distance in the metric system.

DR. ECCLES: As far as Columbia University is concerned, what the Professor says is not exactly correct. My son is a student in that University, and I find that he actually thinks in the metric system.

DR. PAYNE: I use the metric system and require others to use it, and I find the quickest and best way to become familiar with it is to get a set of weights in milligrams—10, 100, 200 and 500 size—and you never think then except in that way. I find that my students, in a few weeks' time, are thoroughly familiar with the metric system of weights and measures, and there is no trouble at all then. But when I try to teach them without using the actual weights and measures, then it is a different matter. The actual use of the metric system in simple milligrams or grams makes it perfectly easy.

MR. RYAN: There is only one right way, and that is to discard the old and adopt the new. You cannot think in German and speak in English. The whole trouble comes in trying to convert one into the other. In fifteen minutes time any man, with ordinary common sense, can understand the metric system.

Mr. Mittelbach: The greatest trouble has not been stated yet—to get the wholesalers to sell their goods to us by the metric system. If you could do that, it would help very greatly.

The Chairman: One of the most important works assigned to this Section last year was a model form of pharmacy law. In pursuance of the resolution of the Section, I appointed a committee to take charge of this work, consisting of Profs. Hallberg, Remington, Oldberg and Ford, of Denver. Quite an elaborate report has been prepared. Prof. Remington is the only member of this committee present. It is a matter of such importance that it should not be lightly passed over, and I ask if the Section will have the report at this time.

Mr. Remington: Mr. Chairman and gentlemen, I fear that I am posing here in this Section in rather a questionable light. I want to say right away that Prof. Hallberg has done the work of this committee almost entirely, and as he is not here I think it only due him to say a few words. I do not think it is necessary to read the whole of the report. Every member of the committee wrote to Prof. Hallberg that he did not agree with the report in everything. Although the report does not receive the signatures of the committee, I would like to see it go in as a work of Prof. Hallberg. I cannot sign it; Mr. Oldberg says he cannot sign it; Mr. Ford, of Denver, says he cannot sign it. If Prof. Hallberg could have been here and met this committee, it would have been all right probably; they could have eliminated some things they do not approve of. But in the absence of Mr. Hallberg, I hope the report will be received as an expression from him.

Mr. Remington then read a number of extracts from the report, the full text of which was as follows:

REPORT ON THE REVISION OF THE PHARMACY LAWS.

PRESENTED TO THE AMERICAN PHARMACEUTICAL ASSOCIATION AT THE FORTY-SIXTH ANNUAL MEETING, IN BALTIMORE, MD., BY THE CHAIRMAN OF THE SPECIAL COMMITTEE OF THE SECTION ON EDUCATION AND LEGISLATION.

With the creation of the Sections of Education and Legislation at the Thirty-fifth Annual Meeting in Cincinnati, in 1887, a great impetus was given to these subjects, although the experience of the first three years showed that the best results could only be secured by merging the two Sections into one, which was effected at the Thirty-eighth Annual Meeting in Old Point Comfort, Va., in 1890.

While the late lamented Secretary, Professor Maisch, had reported annually on the status of pharmaceutical legislation throughout the States, these being printed in the reports, it was not until a few years since that these reports were systematized and made available for reference. The mass of material on these subjects presented at the Forty-second Annual Meeting in Asheville, N. C., in 1894, suggested a new departure in systematic investigation, in order to make comparisons and form conclusions. Since the Forty-third Annual Meeting in Denver, 1895, statistical reports have been made to this Section as follows:

1895. Report on Poison Statistics. List of States Having Poison Laws. Registration Statistics, 1894–5. Registration Requirements of American Pharmaceutical Laws. Report of Special Committee on Pharmaceutical Education.

1896. Report on Legislation and Registration, 1895–6. Comparative Exhibit of Pharmaceutical Board Examinations. Comparative Exhibit of Pharmaceutical Laws of

United States. Suggestion How to Bring About Greater Uniformity in Pharmaceutical Legislation. Resolution anent a Model Pharmaceutical Law.

1897. Summary of Answers to Main Questions of the Committee's Circular of Interrogatories. Report of the Committee on Revision of Pharmaceutical Laws. Appointment of Sub-Committee to present Draft of a General Pharmaceutical Law. Resolution to Restrict the Sale of Narcotics to Physicians' Prescriptions.

Papers have also been presented upon nearly every phase of the subjects concerned in the provisions of a pharmaceutical law.

The first State Pharmaceutical Law enacted was for Georgia in 1868, followed by one for Rhode Island in 1871, although a primitive statute was enacted in Alabama in 1861. The Rhode Island Law was based upon a draft presented to the American Pharmaceutical Association at the meeting in 1869 by Professor Maisch, and remains to-day a better law than the majority of laws since enacted, providing as it does for examination of all candidates for registration, in case of graduates at discretion of the Board; annual registration fee; if proprietor of more than one store, such other store must have at all times, when open, one or more registered pharmacists in charge. It contained, however, the usual concessions to physicians, wholesale druggists and patent medicine dealers, except that it required registration of wholesale druggists who must permit assistant pharmacists only to compound and dispense drugs and medicines at retail. Patent medicines containing articles in the Poison Schedule, or abortifacients and such as are recommended as emmenagogues and parturients are, however, not exempt, and can. therefore, not be sold by other than registered pharmacists.

This law departed from the recommendations of Professor Maisch in not confining ownership to pharmacists, in not requiring graduation from college, and therefore was like the nearly fifty laws since enacted for the various states, fundamentally defective, also in not requiring the following conditions: (1) A higher scholastic education for the beginners; (2) graduation from a pharmaceutical college for eligibility to examination and registration; (3) prohibition of privileges for physicians, manufacturers, wholesalers, etc., and (4) such length of service and curricula as to make it impracticable, if not impossible, for any one to engage in the practice of pharmacy on his own account until of fully matured age, twenty-four to twenty-five years.

To many persons these propositions appear as ideal, as too radical, and that such legislation is impracticable of attainment, objections always encountered in every attempt to reform long-existing evils. But these propositions are based upon the assumption that pharmacal legislation must be solely for the purpose of conserving the public health, safety and morals, and to protect the public against the ignorant, incompetent, careless, and criminal use of drugs, chemicals and medicines (poisons), whose use otherwise would be fraught with danger to human life and happiness, and incidentally to advance and promote the practice of pharmacy to a professional standard equal to that of other branches of medicine. There are no commercial principles involved, consequently none taken into consideration, except in so far as drugs and chemicals used in the arts and industries must be permitted to be sold under strict regulations.

Our laws are mostly based upon that great, yet unwritten law, the English common law, which starts with the individual, as against the Roman law, which starts with the state, and upon which the laws of the countries of the continent of Europe have been constructed. In all English-speaking countries in criminal procedure (except by injunction) the proof of violation rests with the state; while in countries with European codes, procedure is inquisitorial—that is, the accused must shew his innocence. It is because of this distinction that medical legislation of any kind is so difficult to attain and unsatisfactory in our country and in England, except where there is a trace of the Roman code, as in some of the States and Canadian provinces. This important question is, however, only referred to in order that the great disparity in the status of pharmacy in these respective countries may be explained.

In order that this contrast may be readily seen, the legal status and requirements for the practice of pharmacy in the principal countries of the world is herewith shown in the form of all the most important provisions. The information contained has been collected from various sources, from the three principal countries concerned, as follows, respectively:

Great Britain: Pharmacy and Poison Laws. The Chemist and Druggist, London, 1892.

France: Codex Medicamentarius. Paris, 1895.

Germany: Die Apotheken-Gesetzgebung. Böttger, Berlin, 1880, with additions of many of the most recent changes.

SUMMARY OF REQUIREMENTS OF FOREIGN PHARMACY LAWS.

Classes of Establishments.—Pharmacy only in all the countries mentioned except in Austro Hungary, Germany, Switzerland, Drug Stores; in France, Herbalist; in Great Britain, free except poisons.

Apprentice.—Schooling: Gymnasium—Austro-Hungary, Finland, Greece, Sweden, Switzerland; School Certificate and Latin, Germany; Preliminary Examination—Great Britain, Victoria; Italy, five years elementary, five gymnasium, two lyceum; France, First Class B. Arts; Second Class, Lyceum Fourth (abolished).

Assistant.—Number of years learning for examination: three years, Austro-Hungary, Finland, Germany, Great Britain, France, Sweden; two years, Germany (maturient examination), Switzerland; one year, Greece; four years, Victoria; Italy, *none*.

Examination. — Special names: Tirocinal, Austr.; Farmaciæ Studiosus, Finland, Sweden; Gehülfen, Germany (Great Britain, minor examination).

Pharmacist.—Number of years service for examination, curricula, titles, privilege to conduct a pharmacy.

Austro-Hungary: University, two years; registered pharmacist, five years; experience, five years.

Germany: University, three years; experience, three years; provisor, apotheker.

Great Britain: Pharmacy School, two years; Pharmaceutical Chemist; No curricula; major examination; Chemist and Druggist.

France: School of Pharmacy, three years; Pharmacien, first class, B. A., for Dept. Seine; Pharmacien, second class, for other Departments (abolished in 1898).

Italy: University, three years; Experience, one year; Pharmaceutical Chemist.

Sweden: Institute, three years; Experience, two years; Provisor, Apotekare.

Switzerland: Polytechnicum, four years; Experience, one year; Examined graduate.

Victoria, Australia: University, one year; Pharmaceutical Chemist.

The British laws are based solely upon the poison provision, and have not been satisfactory for several reasons, one being the difficulty in having the list extended so as to include all poisonous substances. The long list of fatalities from poison in England, amounting to 2,269 cases during the years 1895 and 1896, shows conclusively that the present law does not afford sufficient protection, and a bill has recently (June, 1898) been introduced in Parliament designed to remedy the evil, without, however, proceeding upon the only true course, namely, to restrict their sale to pharmacists. Of the deaths mentioned, 455 were caused by carbolic acid, which is not included in the list of poisons, and strenuous objection is now being made that its sale should not be restricted on account of the great necessity for its extensive use as a disinfectant.

The following from an editorial in the "Pharmaceutical Journal," July 9th, 1898, presents the case clearly:

PHARMACY AND POISON.

"There is much reason for regretting that, in this country, pharmaceutical legislation has been based so much upon the conception of poison as a danger to be guarded against, rather than designed with regard to the wider requisites of a qualification for the practice of pharmacy, such as the Pharmaceutical Society has endeavored to establish by its educational work during the past fifty years. In the dispensing and compounding of medicine, technical knowledge, skill and care are necessary for public safety, not only in regard to poisons within the meaning of the pharmacy act, but quite as much in regard to either harmless or comparatively innocuous articles. Since both have to be handled simultaneously, the exercise of the business requires to be limited to those possessing certified qualification for the performance of the work; not, indeed, for their particular benefit, but because such a limitation is expedient for the safety of the public. The Society's object in that respect was only partially supported by the State in the Act of 1852, and by further deviation from that object under the influence of temporary acute apprehension of danger from poison, the more comprehensive Act of 1868 was adapted rather for preventing that danger by mechanical contrivances and regulations than for regulating the practice of pharmacy on the more rational basis of educational qualification.

"But still it can be stated with confidence that under the operation of those two statutes the practice of pharmacy, properly so-called, has for many years been conducted in such a manner that deaths due to accident or negligence in compounding or dispensing of medicine have been almost, if not quite, unknown."

LIST OF POISONS AND SUMMARY OF PRECAUTIONS.

List of poisons which it is the exclusive privilege of chemists and druggists and pharmaceutical chemists to sell under the Pharmacy and Poison Act as amended by the Council of the Pharmaceutical Society of Great Britain:

PART I.

Not to be sold unless
the purchaser is known to or is introduced by some person known to the seller;
ALSO
Entry to be made in Poison-book
OF

1. *Date of sale;*
2. *Name and address of purchaser;*
3. *Name and quantity of article;*
4. *Purpose for which it is wanted; attested by signature;*

AND
Must be labeled with

1. *Name of article.*
2. *The word "poison."*
3. *Name and address of the seller.*

Arsenic and its preparations. (For special regulations see below.)
Aconite, and its preparations.
Alkaloids:—All poisonous vegetable alkaloids and their salts.
Atropine, and its preparations.
Cantharides.
Corrosive sublimate.
Cyanide of potassium, and all metallic cyanides and their preparations.
Emetic tartar.
Ergot of rye, and its preparations.
Prussic acid, and its preparations.
Savin and its oil.
Strychnine, and its preparations.
Vermin-killers, if preparations of poisons the preparation of which are in Part 1 of this schedule.

PART II.

Must be labeled with

1. *Name of article.*
2. *The word "poison."*
3. *Name and address of seller.*

Almonds, essential oil of (unless deprived of prussic acid).
Belladonna, and its preparations.
Cantharides, tincture and all vesicating liquid preparations of.
Chloroform.
Chloral hydrate, and its preparation.
Corrosive sublimate, preparations of.
Morphia, preparations of.
Nux vomica, and its preparations.
Opium, and its preparations; and preparations of poppies.
Oxalic acid.
Precipitate, red (red oxide of mercury).
Precipitate, white (ammoniated mercury).
Vermin-killers (see Part 1). Compounds containing "Poisons," prepared for the destruction of vermin, if not subject to the provisions of Part 1, are in Part 2.

Special regulations are to be observed in regard to the sale of arsenic, as the Arsenic Act is still in force.

It would be interesting and instructive to know how many cases of poisoning occur in the United States yearly, especially the deaths caused by accident and by carbolic acid. The statistics presented to this Association in 1895 are suggestive that the fatalities are appalling; in the larger cities scarcely a week passes which does not chronicle a death from carbolic acid. It is more destructive than the trolley, and if sold under proper regulations, at least one-half of the cases could be prevented. Frequently suicide by carbolic acid becomes epidemic in the large cities, as many as three fatalities having occurred in one day in Chicago, all despondent persons, who probably would not have had courage to take their own lives in any other manner but with that popular, swift and certain agent of self-destruction.

A study of the laws of the Continental countries and knowledge of the conditions there, shows that fatalities from poison are exceedingly rare, and discloses the value of the Roman laws or codes constructed by the authorities for pre-sanitary purposes exclusively, without any commercial considerations for the "rights" of individuals (the laity) concerning matters in which it is assumed they have no knowledge.

SALE OF POISONS IN FRANCE.

"The sale of medicinal preparations, including poisons for medicinal use, is restricted to pharmaciens in France, who can only supply the same on a doctor's, surgeon's, officer of health or veterinary surgeon's prescriptions, but poisons used in commerce or in the arts can be sold by other dealers under specific license. A schedule of poisons exists and dates from October 29, 1846, when it was the subject of a royal decree, being incorporated in the regulations then issued and still in force, for the control and sale of poisons. This schedule has of course been added to since, and on each occasion the poisons are defined by a decree issued by the government, who act only after obtaining the advice of the Paris Academy of Medicine, the latter body in turn being always in accord with the Paris School of Pharmacy. For instance, such a decree was issued some years ago regarding the sale of Cocculus Indicus, and specified that its retail sale was rigorously prohibited and exclusively limited to medicinal preparations and prescriptions. The initiative in each case is nominally with the French Minister of the Interior.

"Traders other than pharmaciens wishing to sell poisonous substances must make a declaration to that effect before the mayor of the locality in which they reside. Manufacturing chemists and others employing one or more of such substances are equally bound to make the same declaration. The poisons in question can only be sold to chemists, dealers and manufacturers who have made the desired declaration or to pharmacists. They can only be delivered against an application written and signed by the purchaser. All purchases and sales of poisons must be inscribed on a special register kept by the dealer, and liable to police inspection, in which the name, address, etc., of the buyer or seller must be inscribed. Manufacturers and others using poisonous substances in their workshops must superintend their use and keep a record of the way the poisons are employed on a special register. The regulations concerning the sale of poisons by pharmaciens are very strict and well defined, and the commerce in these substances is controlled periodically by a special local committee which visits all places of business, manufactories, etc., where poisons are used or sold, as well as pharmacies."—*Chemist and Druggist, London.*

As will be observed from the subjoined summary, the committee has failed to secure the co-operation of any considerable number of the State Pharmaceutical Associations, as it was directed to ask for by the resolution passed at the last meeting. Perhaps this is due to a failure of appreciation of that much-exploited legislative principle—the initiative and referendum—upon which the present project was based, or to the difficulties attendant upon a study of the subject and the lack of time and opportunity to give the matter the careful attention its great importance warrants. Whatever the cause, the lack of co-operation is ascribed to the latter causes rather than to indifference on a subject which must necessarily involve not only the material welfare of every pharmacist, but also the future prospects and status of the profession and its practice.

SUMMARY OF ANSWERS TO MAIN PROPOSITIONS OF CIRCULAR OF PHARMACEUTICAL LAW REVISION COMMITTEE, 1898.

The circular report with explanatory letter was mailed in March by the Chairman of the Section on Education and Legislation to the Presidents and Secretaries of forty pharmaceutical associations, forty-eight colleges of pharmacy, forty-four pharmacy boards, a hundred and fifty-six members of pharmacy boards—a total of three hundred and thirty. The Secretary and some interested member of nearly every pharmaceutical association were written by the undersigned, prior to the annual meeting of each association, suggestions to facilitate the presentation and requesting action.

Five associations, Illinois, Maryland, Minnesota, Missouri, Pennsylvania, have reported in full. Two associations, Kentucky, Virginia, referred to Legislative Committee; no report received. One association, Massachusetts, resolution of confidence in American Pharmaceutical Association work. One association, Indiana, no report except for separate Adulteration Act. One association, Connecticut, circular ordered printed in proceedings of association. New Jersey, no report; confused with Preliminary Education Circular. Three associations, Georgia, Virginia, New York, responded; but no report received. Twelve associations have no meeting until August *et seq.* No response received by August 6th from fourteen associations.

ANSWERS TO SIX MAIN QUESTIONS.

1. Limitation of exclusive privilege to poisons. Yes: Illinois, Maryland, Minnesota, Missouri, Pennsylvania.

2. Two establishments. Approved, Illinois, Minnesota, Missouri, Pennsylvania—4; not approved, Maryland—1.

3. Owner, registered pharmacist only. Approved, Illinois, Missouri, Pennsylvania—3; not approved, Minnesota, Maryland—2.

4. Registration, titles. Privileges as outlined in circular, Illinois, Missouri—2; Maryland, except as modified by dissent from number two; Minnesota, except high school graduation for admission to University, two-year college course for assistant pharmacist; Pennsylvania, except ultimately require graduation from college with three years' course.

5. Exemptions all approved as outlined.

6. Adulterations. Section, Illinois, Minnesota, Missouri, Pennsylvania—4; separate statute, Maryland.

Reports from Iowa, Michigan and New York Pharmaceutical Associations have since been received and are attached.

As far as any deductions can be drawn from these answers, the propositions advanced last year are concurred in almost unanimously, the only dissent being by one from two separate establishments, pharmacy and drug store, and by two from exclusive ownership by pharmacists, this latter being based upon legal objections. The educational, registration, exemptions, and adulterations being practically agreed to except that one favors separate adulterations act.

TWO ESTABLISHMENTS.

This proposition has been criticised somewhat, and it is alleged by the *Pharmaceutical Review*, that it is a late day to endeavor to make such an innovation. The point is made that such separation is the cause of much disquietude in the *Apotheken* in Germany and Austria, and that in France it has recently been abolished. The last allegation, as far as we know, is not true. The pharmacien, second class, has been abolished in France, but then this had all the privileges of the first class, except, we believe, the doubtful one of having the right to practice in the Department of the Seine (Paris), while the second class had the other eighty-five Departments. Both classes had the same requirements, except that first class candidates must have secured a Bachelor degree. That the *Apotheker* in Germany and Austro-Hungary should resent the encroachment of the *Droguisten* cannot be wondered at when it is considered what a monopoly the former have always enjoyed through the concessions and "Privilegia." The same commercial causes that operate here and in England are bound to be felt also to some extent in that "El Morro" of conservatism in pharmacy, the Faderland. The privileged apothecaries of these countries should have a dose of their own sýnthetic products which we have had *ad nauseam!* May the present discontent cause our worthy colleagues "to take a fall out" of the Farben Fabriken. If so, the disturbance has not been in vain.

But whatever the objection to separation in these countries, the same does not apply here: First, because pharmacy has been regulated by laws in these countries for a century or more (Allgemeines Landrecht, 1794, for Prussia), and there pharmacy necessarily has a higher and more generally extended educational status; and, secondly, because separation on the basis proposed here would leave the drug business practically on the same basis as at present, but afford in the near future a higher and better status for pharmacy and elevate its profession. The proposed separation would not be *ex post facto*, and therefore all establishments would be first class when the law would be enacted. Its effect would at once, however, be felt in the smaller number of pharmacies that would be established, and the number of drug stores that would be opened would certainly not be any greater, considering that the requirements proposed in the main are as high as they are now, without any distinction as to titles or privileges.

REGISTERED PHARMACIST TO OWN THE PHARMACY.

This proposition has met with much adverse criticism. The average pharmacist hopes for the privilege, but doubts its realization. The drug journals, whose editors assume a knowledge of law and of the constitutional privileges of vested rights, oppose and ridicule it, as shown in the following from the *Pharmaceutical Era*, June 2, 1897:

"The recommendation is one to which we are unalterably opposed. It certainly is ill-advised, to use no stronger term. It is thoroughly unconstitutional, and we believe would be upheld by no court in Christendom. The same sort of thing was tried, but unsuccessfully, in Philadelphia a year or so ago. There is neither law, justice, nor reason in the requirement that the ownership of a drug store shall be restricted to a registered pharmacist. All the law should exact, all that the public can expect or is entitled to, is that drug stores shall be managed and their operations conducted by qualified persons. The proposition, if put into effect, would prevent any one not a pharmacist from investing his money in drug store property; would shut up many a store owned by a non-pharmacist but conducted legally; would break up many a partnership; would prevent a druggist's widow or children continuing the business on which their livelihood depends, and in many ways work undeserved injury.......

"A man has a right to invest his money as he chooses, provided he injures no one. No one is injured by the investment of outside capital in the drug business. What would the druggist think if a law were enacted that he shall not invest his surplus wealth (if he has any) in the shoe business or a sugar refinery? Because he does not know how to make shoes or sugar is no reason he should be debarred from investing in these businesses. He could get some one who does know how to manage affairs."

Pennsylvania is the only State in which the attempt has been made by the introduction last year (1897) of a pharmacy law of which the following is the first section:

HOUSE BILL, NO. 303.

AN ACT

"To amend an act, entitled 'An Act to Regulate the Practice of Pharmacy and Sale of Poisons and to

Prevent Adulterations in Drugs and Medicinal Preparations, in the State of Pennsylvania, approved the 24th Day of May, Anno Domini, One Thousand Eight Hundred and Eighty-seven.

"Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same, that hereafter no person whomsoever shall open, or carry on in the State of Pennsylvania, any retail drug or chemical store, nor engage in the business of compounding or dispensing medicines or prescriptions of physicians, or of selling at retail any drugs, chemicals, poisons, or medicines, without having obtained a license so to do from the State Pharmaceutical Examining Board (and having been duly registered as herein provided). Provided that pharmacists duly registered as such, at the passage of this Act, shall have a period of ninety days from said date allowed them to procure such licenses.

"Any one who shall violate or fail to comply with the provisions of this section shall be guilty of a misdemeanor, and on conviction before any Court shall be punished by a fine not exceeding one hundred dollars."

This bill was passed by the Legislature and then vetoed by the Governor, because it restricted commerce, the clause in parenthesis being held as unconstitutional.

Now, let us take up some of these arguments of the Pharmaceutical Era:

"It is unconstitutional, and would be upheld by no court in Christendom." The Constitution of the United States permits detention of vessels and seizure of counterfeiting materials and gambling apparatus, of goods and chattels for the protection of public health, prohibits transportation of articles designed for criminal and immoral purposes, interdicts the sale of alcoholic liquors to the Indians. It waives all right to interfere with the police power of the States.

The State has the power to abate any nuisance, to confiscate any article of food or drink that is injurious to public health, to confiscate inaccurate weights and measures, petroleum below the flame test, prohibit the sale of alcoholic liquors, thus destroying property, forfeit the charters of corporations and take away their franchises, prohibit the storage of grain in mixed warehouses, regulate the freight charges of railways, destroy buildings during conflagrations, and in a thousand and one similar ways protect the life, health, and happiness of the citizens.

As for "not being upheld by any court in Christendom," exactly the opposite is true. The principle is upheld in all the courts in Christendom, except in the United States, even in Turkey. In Great Britain it is confined to the scope of the law which is restricted to poisons. In every country of Europe, except in some of the Cantons of Switzerland, no one but a registered and fully-qualified pharmacist can own a pharmacy, and in some countries, as in Sweden, they are being acquired by the State, to be placed in charge of such persons who, by educational acquirements, integrity and faithful service, may be selected by the health authorities when vacancies occur in their management.

"A man has a right to invest his money as he chooses, provided he injures no one." This is the catch phrase which appeals to personal liberty, and to license. It is not true, as we have shown under the police powers of the State. The daily life and practice of every conscientious pharmacist deny it. A man cannot invest his money as he chooses in ergot, or other abortifacients, in arsenic, prussic acid, or other violent poisons; in dynamite or other powerful explosives. If a man cannot buy a small quantity of these things, why should he be permitted to buy in large quantities, unless he is qualified to handle them, and under certain restrictions? If he cannot be trusted with simply enough to poison himself, *why should he be vested with the right* to purchase in wholesale quantities?

The arguments anent depreciation in commercial values, the rights of widows and orphans are still more fallacious. How about the commercial values at present? In the larger cities one-half of the stores are now for sale, but no purchasers. Many of them have no value; some pack up and store the stock. Confine the practice of pharmacy as proposed, and competition would be restricted; wholesale houses would not be owning so many stores, and the practicing pharmacist would not only be able to earn a good living and be free from debt, but when he dies he would, in all probability, leave sufficient competency for the widow to properly educate the children, so that they could assume a better, or at least more lucrative, position in the world than to remain in pharmacy. Besides, provision should be made for continuing a pharmacy in estate, for a limited period, with a registered pharmacist.

The State distinguishes between such articles as have no inherent, dangerous properties, and those which have. Drugs and medicines are not ordinary merchandise, since they possess properties which become active and possibly destructive to life without intent of the user or possessor unless he understands their character, properties and uses. For this reason the State regulates the manufacture and custody of explosives. Ordinary merchandise is subject to control; drugs, medicines and poisons are not, except by those who understand them, and their possession should therefore be only in competent hands.

In the practice of pharmacy, the first and most important consideration is the buying of the crude material or the preparations. If the owner cannot perform this duty because of his ignorance, he must nevertheless pay for them. Is it any protection to the public to permit a person ignorant of the identity, purity, strength or quality of drugs or medicines, to purchase these, or to pay for them? Will he not *be governed by prices* with their inevitable reduction in quality, and thus foist spurious and adulterated medicines on the public through the connivance or protest of a registered pharmacist in his employ?

SUGGESTIONS.

The privilege of owning a pharmacy should belong only to a qualified pharmacist. The establishment should therefore also be licensed annually, revokable for cause as in the case of saloons. If the license of a saloon can be revoked because the owner is unfit to dispense liquor, why should not the license of a pharmacy be revoked because the owner is unfit to dispense medicine? No saloon license will be issued to the barkeeper, but only to the owner. Where the State legislature will not concede the ownership principle, the matter can be controlled by the municipality through passage of license ordinance, which should define and describe a pharmacy, or a drug store, "as a room within four walls, with a separate street entrance, and not connected with any other store or room in which articles of apparel, food or drink are kept; aerated beverages, surgical and hygienic appliances, and dietetics excepted."

Should the charter of the city, or town, not specify the regulation and control of drugs, medicines or poisons, as one of the powers delegated by the State along with the power of regulation and control of the sale of liquor, milk, meats, fish, provisions, etc., usually enjoyed, steps should be taken to amend the charter by the insertion of drugs and medicines, or, at least, *poisons*, as articles subject to regulation by local authorities. No legislature can refuse home rule in such matters.

REQUIREMENTS FOR REGISTRATION.

If pharmacy is a profession its votaries must have a professional education. Such education cannot be secured through individual efforts by the youths at present learning pharmacy, except perhaps in very rare instances. It requires special training through laboratory exercises in various branches, and can rarely be acquired except through the systematic instruction a well-organized and modernly-equipped school or college of pharmacy affords. Neither is the position tenable that a person not grounded in the elementary branches of knowledge can acquire such special education, or with the same facility, as one who has attained such scholastic education at least as the average high school offers. Twenty or even ten years ago it was different, but now or in the near future there will be no room for the half-educated pharmacist; he must assume the position of a professional man if he expects to survive. Until the various institutions teaching pharmacy are in a position to maintain a fairly uniform standard for admission, the requirements should be made preliminary to the apprenticeship and be contained in the law.

The query has been often raised, does an examination really examine? This may be answered only by first defining an examination. As applied to the average board of pharmacy examination, it may be answered in the negative. The real status of a candidate's qualification to practice requires not only an exposition of his knowledge and skill, but also *determination of his capabilities* to use such in the practice of his profession, for the advancement of his calling and the benefit of society. This cannot be ascertained by the boards of pharmacy as at present constituted, but must be based upon the record and observation of work performed under the direction of competent teachers. Any other method must be superficial. The boards of pharmacy should therefore confine their work to that of supervising the colleges, establish and maintain standards for admission and graduation, and, when feasible, aid in the examinations for graduation. The colleges and the boards should work together, so that graduation means also registration by the board. The recognition of diplomas alone is not favored, but diplomas awarded with the aid and co-operation of the board should be accepted for registration, when with fairly uniform requirements secured, reciprocity between the various state and local boards would soon be an accomplished fact. The compulsory course should, as soon as possible, require an extended curriculum comprising analytic, bacteriologic and physiologic work to fit the coming pharmacist for his higher duties, namely, to perform all the functions required by the advancement and progress of medical and sanitary science. So long as the practice of medicine was purely medical, these functions were largely confined to the preparation and compounding of medicines; but a new era has set in, and if the pharmacist wants to keep his place as the physician's right arm, he must qualify for the work which the physician would rather entrust to the pharmacist, other things being equal, than to a non-pharmacist.

As will be observed by the exhibit of requirements in the continental countries, there is usually a period of post-service of several years (mostly five years) before the pharmacist is permitted to practice on his own account. The reason for this is the recognized fact that not until a person has passed the period of adolescence is his moral conception fully developed, his character fixed. This in the male is the age of twenty-four to twenty-five years (for this latitude), and it is held that no person should engage on his own account in a calling of so great responsibilities, trials and temptations as that of the practice of pharmacy until his moral, as well as mental status is fairly established. If this principle had been recognized by us, the practice would have been in stronger and better hands, and many a young and inexperienced pharmacist might have been a stronger and better character, more devoted to the advancement of his profession, and he as well as his colleagues enjoy a better material existence.

EXEMPTIONS.

The exemptions might be extended so as to include rules to be observed in the sale of poisons of Class B, "Mineral and Corrosive Poisons" to non pharmacists, as shown under the paragraph, "Sale of Poison in France."

Since it is proposed that Class A, "Violent Poisons," should only be sold upon physicians' prescriptions, the purpose of the resolution passed by this Association last year restricting the sale of narcotics, cocaine, etc., is amply covered, with the additional precaution that such prescriptions be not repeated except by the prescriber's order, nor the original or copy of such prescription be furnished. The protection afforded the public against the use of poisonous or potent patent medicines, by affixing a label directing attention to their dangerous properties, except when sold by a person qualified to pass upon their character—the registered pharmacist—should be insisted upon.

An adulteration section should be drafted on new lines. as clearly as possible, defining and limiting the requirements, especially of such preparations as are, under the best of care and conditions subject to change. The deterioration of spirit of nitrous ether is an example. Pharmacy laws must be for the protection of the public; they were never designed or intended by any legislature for the purpose of harassing the pharmacist so long as he endeavors to conform to them. If more care had been bestowed upon the enforcement of these laws, they would rarely fail of support.

In conclusion, the writer desires to state that this report is simply the result of his findings as far as the publication of last year's report is concerned. It presents, however, all the important provisions for consideration. These having been passed upon, the drafting of laws by the various State Pharmaceutical Associations will be much facilitated. C. S. N. HALLBERG.

Chicago, August 6, 1898.

ADDENDUM.

The following reports were received August 15 and 18 respectively, too late for incorporation in the committee's report. C. S. N. HALLBERG.

Chicago, August 20, 1898.

REPORT OF THE IOWA PHARMACEUTICAL ASSOCIATION.

DES MOINES, IOWA, *August* 13, 1898.

PROF. C. S. HALLBERG, *358 Dearborn St, Chicago, Ill.*

Dear Sir: Replying to circular received some time since, I am authorized to answer the questions propounded as follows:

No. 1. No A general law as nearly common to all states as it is possible to get under our form of government should make exclusive to the registered man under it more than the field of medicine bounded by poisons.

No. 2. No. The rural resident is as much entitled to capable service as denizens of the larger places.

No. 3. No.

No. 4. It is doubtful if the country as a whole is yet ready to say that none but pharmaceutical graduates shall practice pharmacy, if, indeed, any part is. But a high standard of efficiency should be insisted upon by boards of pharmacy, and a higher one if possible than heretofore. As to a definition of titles, no expression is made. Privileges under titles given should accord with the responsibilities placed upon the registered man.

No. 5. No poisons should be exempted, whatever their character or uses. That class of drugs usually denominated heavy drugs perhaps should be permitted in the hands of other dealers than the registered pharmacist. The exigencies of trade, better known to the student of the subject than to this Committee, must determine a question of this nature.

No. 6. An adulteration section would seem to be a proper and desirable part of such a law. Yours very truly, A. H. MILES,

Secretary Iowa Pharmaceutical Association.

REPORT OF THE NEW YORK PHARMACEUTICAL ASSOCIATION.

In answer to the request from the Section on Pharmaceutical Education and Legislation to send an expression of views on the different points of the report on the revision of the Pharmacy Laws, the State Board of Pharmacy of New York submits the following:

The propositions in brief as set forth in this report we understand to be as follows:

The fact is stated, and it might be well to include and emphasize it in the law, that the only, yet sufficient reason, for the enactment of a pharmacy law is that it is for public safety and benefit.

The report proposes to protect the public by restricting the care and sale of all poisons and poisonous substances to those who are properly qualified. In doing this, it divides poisons into two classes—*A*, violent, and *B*, corrosive—and makes a third class, *C*, of potent drugs, the average dose of which does not exceed a specified amount. It proposes also to restrict the sale of all proprietary medicines containing these drugs in such quantities as to make their use unsafe, to the same properly qualified persons.

It proposes two classes of stores, a pharmacy and a drug store, and two grades of properly qualified persons, pharmacists and druggists. The pharmacy may keep and sell all medicines, the drug store only such as are not included in classes *A*, *B*, or *C*.

The standards of qualifications are to be determined by examinations equal to those required in junior and senior courses in schools of pharmacy. The druggist must have a general education sufficient to entitle him to enter a high school, have served two years in a pharmacy as assistant druggist, and be 18 years old: and the pharmacist must have had four years' experience in a pharmacy, two of which must be as a druggist, and be 21 years old, to entitle him to apply for examination in the respective grades.

The adulteration of drugs and medicines is to be supervised by the Boards.

The report in all its details is elaborate, shows much thought and work in its preparation, and is worthy of high commendation and thoughtful consideration. The criticisms here offered are with the realization that it is easy to object to or criticise, but not so easy to offer substitutes. We believe the propositions for regulating the sale of poisons are too elaborate, and that they will place hurtful restrictions upon trade. There is no question but that the least possible restriction on trade is best. We therefore suggest the usual classification of poisons which is now in force in many States and localities.

Class *A*, to include the most violent poisons, these to be marked poison, with antidote and treatment if thought best, and the sale registered. This class should not be made larger than is absolutely necessary for the protection of the public and to assist in the detection of crime, and may well be limited to such agents the ordinary adult dose of which does not exceed 5 Grs. or 5 minims.

Class *B*, to be marked poison, with antidote and treatment, but not registered, and to include agents the ordinary adult dose of which is between 5 and 10–20 or 30 Grs. or minims.

The formation of a third class, *C*, of potent agents, the sale of which is to be limited to pharmacists, and the sale of all less potent agents to be given to druggists, is a somewhat new form of an old method of adapting a pharmacy law to thinly populated sections, as well as populous districts and cities. It does not seem possible for the druggist and pharmacist to occupy the same territory. The present New York State law allows all merchants in all places to sell a very limited list of agents, and all merchants in rural districts (these are places having no licensed pharmacist) to sell the potent drugs and poisons under certain restrictions. This privilege ceases should a pharmacist come into the place. The proposition to license all such places is good. We incline to the view that the limiting of the druggist to such localities as do not have a pharmacist is the best, because we do not think the two will naturally flourish in the same locality, and also because of friction and infringement of the druggist upon the province of the pharmacist. The granting to Pharmacy Boards the power to determine what proprietary agents should be sold only by pharmacists, or have a detrimental label placed upon them, is one which we do not believe will be granted very soon by legislative bodies, and which if granted will be a source of vexation to Boards, and offer temptation to practices which would be abundantly, and probably justly criticised.

The age of applicants for license merits consideration. It is not just to withhold from any one a position which he can prove himself competent to fill because he has not attained a certain age, and yet no one will deny that there is an age limit, irrespective of other qualifications. It would seem that this limit for the higher grade should not be more than two years beyond the lower, because the experience required is four and two years respectively. If a greater difference is required, as 18 and 21 years respectively, then the applicant who becomes a competent assistant at 18 years is compelled to serve

5 years to reach the higher grade. There are many young men who are probably able to pass to the higher grade at 20 years, and we suggest such age in place of 21.

We believe a high standard for fitness to become pharmacists and druggists should be maintained, and that in theory the one here outlined is none too high if it can be put into practice. This we do not believe possible under present laws, because of insufficient means at the disposal of Boards to carry them into effect. The proposition to add to the duties of Boards of Pharmacy the supervision and adulteration of the purity of medicines, brings an added expense, and, therefore, necessity for further increase of receipts. If the foundation of pharmacy laws is correct (public benefit), then the expense of executing such laws should be paid from the public treasury. This has, so far as we are informed, never been done. The laws are voluntary obligations placed by pharmacists upon themselves, and thus far the expense of executing these laws has come from their pockets. We believe that these restrictions and this expense have been borne by the great bulk of pharmacists willingly and cheerfully, and with the highest motives—the advancement of the science and art of pharmacy. There are some pharmacists, and a large percentage of the general public, who look upon these laws as class legislation, and this view, as we have intimated, should be vigorously combated. The question of expense is vital, and thus far has been met by examination and re-registration fees. Receipts from prosecution cases do not pay the cost of the litigations. The re-registration fee is regarded by many as odious, and this Board is not unanimously in favor of it. A re-registration of pharmacies and drug stores, giving the equipment of such, as to clerks and assistants, seems less objectionable, and is more valuable as a record, than individual re-registration, and we, therefore, recommend its adoption. The proposed standard of examinations requires permanent rooms and fittings, and in large and populous States, more than one of these would be necessary. It would, therefore, seem that the public treasury must be called upon to bear some portion of the expense, or the examination fee must be increased beyond the $5.00 and $10.00 limit, and the registration beyond one dollar. In carrying out the proposed examinations, we believe that the theoretical (written) examination is of the greatest importance, the practical examination in dispensing, compounding, identifying and testing next, and that the oral examination is of the least importance and may be limited to the reading of prescriptions and doses. In the practical examination, we would suggest the allowing of consultation of standard works upon the subjects treated of, the same as obtains in the actual practice of the business.

All of which is respectfully submitted,

ALFRED B. HUESTED, *President*,
EDWARD S. DAWSON, JR., *Secretary*,
CURTIS H. HASKIN, *Treasurer*,
FRANK L. NORTON,
J. CLITHERON SMITH.

REPORT OF MICHIGAN PHARMACEUTICAL ASSOCIATION.

ANN ARBOR, MICH., *August* 13, 1898.

PROF. C. S. HALLBERG, *Chicago, Ill.*

Dear Sir: Your communication to the Secretary was presented to the Association at their meeting last week, but as the program for its work was laid out and time rather limited, owing to long discussions on some of the topics, the same was received and submitted to a special committee with instruction to take up the various points to be considered and make reply of the results of their deliberations directly to you.

The committee appointed at the meeting met on Monday last and disposed of the questions as noted on enclosed copy of our deliberations. You will notice that we reply to the question of "What articles and persons should be exempt?" with a copy of section 10 of our pharmacy law, which expresses the views of our Association on this question.

The M. S. P. A. has had under consideration at the last meeting the revision of our pharmacy law, and the prompting motive of bringing about this revision is this very question. It is the opinion of the Association that recognized physicians should be the only parties exempt from the general regulations of the practice of pharmacy, so far as the compounding and dispensing of medicines for their *own patients* and *that only* is concerned.

Shall the exclusive privileges of pharmacists to prepare, compound and dispense drugs, chemicals and medicines, be limited to poisons and poisonous substances? No.

Shall there be two classes of pharmaceutical establishments; upon what conditions shall the distinction be based? No.

Shall any one but a registered pharmacist have the right to own a pharmacy or drug store? The law says yes.

What shall be the requirements for registration, with definition of titles and privileges? As in Michigan at present.

What articles, for which purposes, and what persons shall be exempt? As per following report at the meeting at Port Huron, by Committee on Revision of Pharmacy Law.

"SEC. 10. Nothing in this act shall apply to, or in any manner interfere with, the business of any practicing physician who does not keep open shop for retailing, dispensing or compounding of medicine and poison to others than his own patients, or prevent him from supplying to his patients such articles as may seem to him proper. *Nor with the selling by any retail dealer of patent or proprietary medicines or drugs or* of drugs, medicines, chemicals, essential oils, extracts, tinctures and medicinal preparations, which are put up in bottles, boxes or packages, bearing labels securely affixed, which labels shall bear the retail or wholesale firm name and the name of the *registered* pharmacist under whose supervision the same is put up, the dose that may be administered to persons three months, six months, one year, three years, five years, ten years, fifteen years, and twenty-one years of age, and if a poison, the name or names of the most common antidotes; *nor with the selling by any person* of copperas, borax, blue vitriol, saltpeter, spices, sulphur, brimstone, quinine, quinine pills, compound cathartic pills, liquorice, sage, senna leaves, castor oil, sweet oil, spirits of turpentine, spirits of camphor, sweet spirit of nitre, oils of lemon, peppermint and wintergreen, glycerin, Glauber salt, Epsom salt, cream of tartar, bi-carbonate of soda, sal soda, alum, Paris green, sugar of lead and such acids and salts as are used in coloring and tanning, nor with the exclusive wholesale business of any dealer: Provided, That all articles herein exempted being classified as poison by the poison act be properly labeled with prescribed poison label, giving caution and antidote, label bearing name of firm making sale."

Shall the act contain an adulteration section, or is a separate statute preferred? The question as to purity of drugs, etc., should be under supervision of pharmacists, and the act should provide for it by an adulteration section.

As to the articles to be placed on exemption list, we favor the plan of narrowing it as much as possible without interfering with the convenience of the public, and you will notice from the wording of section referred to that it is our opinion that a large list of the exempted articles, although handled by the general merchandise trade, should be under the control of the licentiate pharmacists by making a provision that all pharmaceutical preparations handled by the general merchandise trade should be put up in ready packages, bearing a label with dose and the name of the pharmacist under whose supervision the special preparations are put up with the exceptions of Epsom salt, Glauber salt, etc., as mentioned in our section 10. By this plan the public would suffer no inconveniences, the general merchandise trade would be perfectly at liberty to handle domestic remedies, hive syrups, tolu, etc., and at the same time would be a guarantee that the goods would be proper standard, as the licentiate pharmacist, under whose supervision such parcels would be put up, could be held responsible.

Our Association is fully in accord with the idea of a uniform pharmacy law throughout the Union, and we consider the present labors as the pioneer work for bringing about the final enactments to create uniformity throughout the United States, but it is our opinion that the consideration of the various conditions of different States as to density of population and general development will for some time stand in the way of the practicability of a strictly uniform pharmacy law throughout the States, but an era of uniformity can be inaugurated by adopting at least such sections which would be acceptable and could be carried out in all States, without working hardships on any section.

Our committee presents results of their deliberations for what they may be worth to your committee in summing up the results of your work for final report.

Yours truly,
A. B. PRESCOTT,
OTTMAR EBERBACH,
A. C. SCHUMACHER,
Committee.

Upon motion of Mr. Weiner, seconded by Mr. Lemberger, the report was received and referred for publication.

THE CHAIRMAN: I wish to add my testimony to the great value of much that is in this report. While there is much of it to which I cannot give my consent, there is a great deal in which I heartily concur, especially as to the constitutionality of laws restricting the ownership of drug stores to properly qualified men. I believe that such laws are constitutional if properly constructed, in the majority of States, and I agree in the wisdom of the general policy of restricting the ownership of drug stores to properly qualified men.

Dr. Eccles read abstracts of two papers by himself upon "The New Pharmacology," and on "Colleges of Pharmacy and The New Pharmacology." Said papers were as follows:

THE NEW PHARMACOLOGY.

BY ROBERT G. ECCLES, M. D.

The science of Pharmacy in its empirical phase is quite old, but as a coherent body of rational knowledge it is only at present in its infancy. Twenty-one years ago the German botanist Pfeffer performed the initial experiment that has led the way toward present results. In 1886 and 1887, Van't Hoff and Arrhenius pointed out how pregnant with meaning this experiment really was. Up to the time their speculations were published, no one had foreseen how immeasurably grand the outcome was likely to be for pharmacy, biology and practical chemistry from a discovery apparently so insignificant. Pfeffer himself only saw that he had imitated microscopically what plants are constantly doing in their microscopic world by aid of the protoplasmic wall of the cell, and that, therefore, he had made a discovery that would prove of great benefit to students of plant physiology. He took a weak solution of potassium ferrocyanide, dipped into it a porous jar fitted with an upright tube, and containing a solution of sugar colored with a little copper sulphate, when there formed immediately on the inside of the jar a precipitated membrane of ferrocyanide of copper. This membrane allowed the ingress of water from the solution outside of the jar, but hindered the egress of the sugar molecules through the same channel. In this way pressure was brought to bear on the membrane, and the solution forced into the tube until equilibrium was established, when for the first time a quantitative estimate of osmotic pressure became possible. (Theoretical Chemistry, Nernst. p. 119 and Osmotische Untersuchungen., Leipzig, 1877.) To realize the importance to pharmacists of this discovery, one must picture to himself a world without scales, where suddenly some one had discovered a pair and their use as a means of research. It opened up a new science, through the quantitative investigation of the very phenomena in which pharmacists are of all men most interested. The great bulk of their work is concerned with solutions. Not an extract, pill, powder, tincture, elixir, herb, root, crystal or amorphous mass in the stock of any drug store, but has been, will be, or is now in solution. They were all first formed in solutions, and before their medicinal values can be realized by the patients who take them, they must go into solution again. Up to the time Pfeffer made his discovery, there was no way to study or learn a single law governing solutions, or of learning why this, that or the other thing that happened in a solution did so. All pharmaceutic work done prior to and for some years after that time, was purely empiric. None of it was rational. Our works on pharmacy up to this present year of grace have all been empiric. A new era is dawning upon us, and the next century will begin to rewrite our books in a language that to those who fail to keep abreast of advancing science will sound new and strange.

When Van't Hoff in 1886 published his "Loi de l'equilibre chimique dans l'Etat dilute ou dissous" (Law of Chemical Equilibrium in Dilute Solutions), it was as if he had opened up a new world to the gaze of physicists and chemists. He pointed out that Pfeffer's experiments which he had confirmed proved that substances in dilute solution behave exactly as if they were gases, and obey laws analagous to those of Boyle and Gay-Lussac. When we dissolve sugar in water, the osmotic pressure of that sugar is exactly the same as the pressure it would exert if it was a gas of the same volume and at the same temperature. Every dissolved solid is practically a gas diffused through a medium denser than air. Its solution occurs because its molecules are driven apart by heat, and they float around and exert a pressure equivalent to that heat. Nernst states it in these words: "The osmotic pressure of a dissolved substance is exactly the same as the gas pressure, measured by the manometer, which one would observe if he could remove the solvent, and leave the dissolved substance as a gas filling the same volume." (Theoretical Chemistry. Prof. W. Nernst, Ph. D., of the University of Göttingen. Palmer's Translation, page 148.) But, if solids in solution obey the laws of Boyle and Gay-Lussac, why not the law of Avogadro? Naturally Van't Hoff put this question to himself and was compelled to answer that they should. If this is so, then every substance in solution under the same conditions of temperature and pressure must contain the same number of molecules. Those of us who are familiar with the history of the fifty years' neglect of

Avogadro's law and the grounds on which its truth was finally sustained will recall the appalling confusion of thought that then prevailed even among the educated regarding the difference between an atom and a molecule. When, finally, it became clear to all that atoms are one thing and molecules quite a different thing, objections died out and the doctrine was accepted, much to the benefit of chemistry. Van't Hoff's extension of Avogadro's law met a somewhat similar difficulty at the very beginning of its career.

While it seems to be true in every detail regarding non-electrolytes, it appeared to fail completely when applied to electrolytes. While solutions of sugar obeyed the law without a peradventure, solutions of salt acted as if they were not under its control. The pressure of the latter is always too high. The explanation of this anomalous conduct on the part of conducting substances came from Arrhenius. He discovered that the depression of the freezing point produced by electrolytes when dissolved in water is as erratic as that of the osmotic pressure. Among non-electrolytes the conditions of definite relation of the freezing point to osmotic pressure are constant. With electrolytes the depression is always lower than it should be according to theory. If we take this in connection with Raoult's law that is a direct outcome of experiment, the meaning is clear. According to Raoult, "if one dissolves in any selected solvent, equi-molecular quantities of any selected substances, the freezing point is lowered the same degree in all cases." (Raoult, Zeitschrift f. phys. Chem., 2, 353, 1888.) Arrhenius at once came to the conclusion that some of the molecules in electrolytes when in solutions break up into a sub-molecular condition, or, in other words, are dissociated, giving off their radicals to act like free molecules. This is known as the theory of electrolytic dissociation. Prof. Nernst says of this that it "at first appeared as a mere make-shift in explaining the application of Van't Hoff's law to electrolytes in water solution; but very soon, being supported by an abundance of results previously unexpected, it developed to become a mighty support to the Van't Hoff law; and at present there is scarcely any doubt that it represents an entirely new phase in the development of our conceptions regarding molecules." (Theoretical Chemistry, Nernst, p. 150.) H. C. Jones, Ph. D., of Johns Hopkins University, says "it is so far-reaching in its significance, so fundamental in its bearing, that any physical or chemical property of solutions can reasonably be summoned to furnish evidence as to its validity.". (Johns Hopkins Bulletin, June, 1898, p. 137.)

According, therefore, to the present current doctrine among leading physicians and chemists, a very dilute solution of table salt in water is not a solution of chloride of sodium, but one of chlorine ions and sodium ions. Salt is no longer considered salt when thus dissolved. The chloride is decomposed or dissociated into free atoms of chlorine and sodium. These are held to be charged with electricity, and while in this condition are known as ions. The chlorine ion is charged with negative electricity and called the anion, while the sodium ion is charged with positive electricity and is called the cation. Salts, acids, and bases of all kinds being electrolytes, are dissociated as soon as they are dissolved in water. The amount of dissociation depends upon the temperature, the kind of solution, the strength of the solution, etc. With strong bases, strong acids and neutral salts, at ordinary temperatures, nearly 90 per cent. is dissociated when to ten liters of water molecular weights in grammes are added. With moderately strong acids and bases the amount of dissociation is about ten per cent. Most salts, strong acids, and strong bases are completely dissociated in solutions of about one-thousandth normal. One out of many proofs of the truth of the theory of dissociation is found in studying mixtures of salt solutions. A solution in water of potassium bromide of one-thousandth normal mixed with another of sodium chloride of the same strength will, according to the theory, contain potassium, sodium, chlorine and bromine ions. A solution of potassium chloride in water, and one of sodium bromide of the above named strength also mixed, will contain exactly the same ions, and the properties should be exactly the same in every particular. This is found to be the case. With solutions of non-electrolytes, and that therefore do not decompose, cross-mixtures of this kind do not have properties in common.

This is seen when we mix ethyl chloride with methyl bromide and compare this with a mixture of ethyl bromide and methyl chloride. The properties of two such mixtures are wholly unlike. A number of ingenious methods have been devised for determining the amount of electrolytic dissociation, each of which furnishes convincing proof of the fact that such dissociation actually occurs. Some are based on osmotic pressure, some on the lowering of the freezing point, some on the raising of the boiling point, some, like those of Ostwald and Kohlrausch, on electrical conductivity, some by the catalytic action of hydrogen ions upon the inversion of cane sugar, and some by the aid of the electromotive force of specially-prepared cells. (Ostwald, "Hand und Hilfsbuch zur Ausführung Physiko-chemischer Messungen," Leipzig, 1893. Theory of Solution and its Results, Morgan.) It should be distinctly understood that the dissociation that occurs in solutions of electrolytes is not from molecules to atoms, as might be inferred from our illustration with chloride of sodium. While all the metallic chlorides are thus dissociated, the chlorates are not. While KCl in dilute solution becomes K (potassium-ion, the cation), and Cl (chlorine-ion, the anion), $KClO_3$ becomes K (potassium-ion, the cation), and ClO_3 (chlorate-ion, the anion). The reason why metallic chlorides in analysis react for chlorine, while chlorates, chloro-acetates and the like do not, is because in the latter no free chlorine is present in their solutions. The reaction is a reaction of ions. Ostwald says of this that, "In all cases in which an element is a constituent of a compound ion, it loses its ordinary reactions, and in place of these we get new ones, characteristic of the latter." (Foundations of Analytical Chemistry, p. 50.) The double chlorides of platinum with metals are found not to be chlorides at all, but salts of hydro-platinchloric acid. Our so-called potassium platinchloride, K_2PtCl_6, becomes in solution K and K (potassium-ions, the cations), with $PtCl_6$ (platinchloric-ion, the anion). When cobalt chloride, $CoCl_2$, goes into solution it dissociates into Co (cobalt-ion, the cation), with Cl and Cl (chlorine-ions, the anions), but when potassium cobaltic cyanide goes into aqueous solution, the $K_3Co(CN)_6$ becomes K, K and K (cations), with $Co(CN)_6$, the anion.

Those of you who have ever made this solution may have wondered why it did not have the red color common to aqueous cobalt solutions. Here you have an explanation. There are in this no free cobalt ions to impart the color. Solutions of mercuric iodide in potassium iodide contain no mercuric iodide ions, but ions of mercury and iodine. In studying the nature of the kinds of ions that form in given solutions, the wanderings of the ions, the velocities of the ions, the number of ions present in given solutions, and the effects of ions of various kinds upon each other, physiology, bacteriology, sanitation, toxicology, and through these pharmacy is at present being enriched very fast. The work of Loeb (Physiologische Untersuchungen ueber Ionenwirkungen, Arch. f. d. ges. Physiol., lxix., 1) and of Kahlenberg and True (Botanical Gazette, xxii., 81) in animal and vegetable physiology respectively, that of Krönig and Paul (Zeitsch. f. Hyg. u. Infectionsk., xxv., 112, 1897) in bacteriology and sanitation, illustrate the trend of investigation.

In a paper on pharmacology published in the Practitioner for February, 1898, page 174, by G. R. Marshall, M. A., M. B., of the Pharmacological Laboratory of Downing College, Cambridge, England, is given a good epitome of their results. Loeb it tells us "used the gastrocnemius of the frog, and observed the variations in weight produced by an hour's immersion in dilute solutions of substances in normal saline solution. Inorganic acids (nitric, hydrochloric, sulphuric) and acid sulphates (of potassium and sodium) produced an increase in weight which is a function of the contained hydrogen ions. The anions (Cl,NO_3,SO_4) seemed to be without effect. The same result was obtained by Kahlenberg and True on vegetable tissues. Solutions of these different acids, containing the same number of hydrogen ions in a given volume, produce the same quantitive increase in weight. This relation does not hold, however, for organic acids, which are dissociated to a less degree; here an influence is exerted by the anions and the undissociated molecules present. In the case of bases (sodium, potassium, lithium, strontium and barium hydrates) the increase in weight is solely a function of the number of hydroxyl ions, and dilute solutions of the different bases containing equal numbers of hydroxyl ions in the same volume cause the same increase in weight. Hydrogen ions are found to be more toxic than hydroxyl ions. Chlorides of the alkalies and alkaline earths bring about the same change in weight as solutions of sodium chloride with the same osmotic pressure. The relative toxicity of potassium, sodium, lithium, rubidium and caesium ions for muscle runs parallel with the migratory rapidity of the ions, and not with the atomic weights. A similar parallel occurs between the ionic velocity and relative toxicity of beryllium, magnesium, calcium, strontium and barium ions. Such a relation, however, is only to be expected between ions belonging to the same group in a natural system."

The work of Krönig and Paul is more fully given than that of Loeb. They carried out their experiments with minute precautions. "Equi-molecular solutions, the same stock of culture medium, the same micro-organisms (anthrax spores and staphylococcus pyogenes aureus) under the same conditions, were always employed; the temperature of the disinfecting solution and the time relations throughout were kept constant; care was taken to destroy the disinfectant adhering to the organisms, usually by chemical means; and control experiments were carried out in all cases where they seemed necessary. The substances used are divided into six classes: (1) Salts—of mercury, silver, gold, copper, zinc, cadmium, lead, etc; (2) acids—hydrochloric, hydrofluoric, hydrobromic, hydrocyanic, perchloric, nitric, sulphuric, phosphoric, silico-fluoric, trichloracetic, dichloracetic, oxalic, formic and acetic; (3) bases—potassium, sodium, lithium and ammonium hydrates; (4) the halogens—chlorine, bromine, iodine; (5) oxidizing substances—nitric acid, dichromic acid, chloric acid, chlorine, permanganic acid and persulphuric acid; (6) organic substances—solveol, solutol, lysol, creolin, phenol, formaldehyde. Besides aqueous solutions, solutions in bouillon, gelatine, etc., and in methylic and ethylic alcohols and acetone were investigated." The following represents 21 conclusions which they reached as a result of their experiments:

"(1) Comparative investigations on the toxicity of different substances must be carried out with equi-molecular amounts.

(2) The disinfecting power of solutions of metallic salts does not depend merely upon the degree of concentration of the metal in the solution, but also on the specific properties of the salt and the medium in which it is dissolved.

(3) Solutions of metallic salts have an extremely weak disinfecting power if the metal is part of a very complexion, and if in consequence the concentration of the metal ion is very small.

(4) The action of a metallic salt does not depend on the specific power of the metallic ion alone, but also on the negative ion and the non-dissociated parts.

(5) The halogen compounds of mercury and the cyanides and sulphocyanides act in reason of their degrees of dissociation.

(6) The disinfecting power of aqueous solutions of mercuric chloride is

diminished by the addition of halogen compounds of the metals and hydrochloric acid. It is probable that this diminution of the disinfecting power is due to a recombination of dissociated ions.

(7) The disinfecting power of aqueous solutions of nitrate, sulphate and acetate of mercury is sensibly increased by the moderate addition of sodium chloride.

(8) Acids disinfect in proportion to their electrolytic dissociation—*i. e.*, in proportion to the concentration of the hydrogen ions in the solution. The anions and the non-dissociated molecules of hydrofluoric acid, nitric acid, and trichloracetic acid have a specific toxic action. This, in proportion as the dilution increases, becomes weaker with reference to that of the hydrogen ion.

(9) The bases—potassium, sodium, lithium, and ammonium hydrates—disinfect in proportion to their degree of dissociation, *i. e.*, in proportion to the concentration of the hydroxyl ions in the solution. Hydrogen ions have, in equal concentration, a greater action against anthrax spores, and especially staphylococcus pyogenes aureus, than hydroxyl ions.

(10) The disinfecting power of the halogens—chlorine, bromine, iodine—diminishes as their atomic weight increases.

(11) Oxidizing agents—nitric, dichromic, chloric, persulphuric, permanganic acids—are more active according to the degree of electrolytic dissociation. Chlorine takes no place in this series, as it possesses a very powerful specific action.

(12) The disinfecting power of the various oxidizing agents is notably increased by the addition of a halogen acid—*e. g.*, hydrochloric to permanganic acid.

(13) Solutions of phenol disinfect better when combined with salts.

(14) Substances dissolved in ethylic or methylic alcohol or ether have almost no disinfectant effect on anthrax spores.

(15) The disinfecting action of aqueous solutions of silver nitrate and mercuric chloride is sensibly augmented by the addition of a certain amount of ethyl or methyl alcohol, or acetone.

(16) The disinfecting power of aqueous solutions of phenol and formaldehyde diminishes with the addition of ethyl or methyl alcohol.

(17) The disinfecting power of metallic salts is, generally speaking, less in bouillon, gelatine, and albuminous fluids, or solutions of these in water, than in pure water. It is probable that the lessened disinfecting power is due to a diminution of the concentration of the metallic ion in the solution.

(18) It is inadmissible to draw conclusions from the disinfecting power of a substance as to its antiseptic power.

(19) It is probable that the electrolytic dissociation of a metallic salt plays a small part in preventing the development of organisms. This mainly depends on the concentration of the metal in the culture medium.

(20) There exists some general law between the concentration and toxicity of mercuric chloride solutions, and it is probable that similar relations are to be observed with solutions of other bodies.

(21) The toxic action of metallic salts on living vegetable cells stands in a definite relation to their degree of electrolytic dissociation."

These principles are of great value to the manufacturing pharmacist, in that they give many hints concerning how to combine and how not to combine lotions, washes and disinfecting fluids when he wants to get desirable results at the minimum of cost. They show, too, how internal remedies containing such ingredients can be given to the best advantage. They give the cue to the physiological laws governing drug action, and they open the way to an understanding of what toxic action consists in. As other phases of the theory of solution are taken up by experimenters there can scarcely be a doubt but that it will revolutionize pharmacy. Its suggestiveness covers the whole field of pharmacy and makes discovery comparatively easy work for those who clearly understand its bearings. If I may be permitted to use a metaphor in this connection, it teaches the pharmaceutical miner just where to dig for coal, iron, gold or other treasures with the certainity of finding them, instead of as in bygone days hunting gold in carboniferous strata, iron in Devonian and coal in silurian. The element of pure accident is now excluded, and that of principle has taken its place.

COLLEGES OF PHARMACY AND THE NEW PHARMACOLOGY.

BY ROBERT G. ECCLES, M. D.

Pharmacy is an art. Pharmacology is the science of pharmacy. As arts grow empirically prior to the discovery of the fundamental principles or laws that underlie them, so pharmacy preceded pharmacology. In this age science is everywhere asserting its supremacy and remodeling the arts in accordance with its decrees. Pharmacy is now coming under its control, and many pharmacists are yet unaware of the fact. If pharmacists wish to keep abreast of the times they should begin at once the work of putting pharmacy upon the new foundation of rational pharmacology. Science, like a tree, is a growth. Its branchlets bud and develop out of each other. As the repository of the great branches of science is within the universities, so from them came the earliest intimation of a new unfolding. This is why the beginnings of pharmacology came hence, and not from our colleges of pharmacy. It is now time, however, for the latter to take up their part of the work and proceed systematically along the new lines. In behalf of pharmaceutical students and pharmacists the writer now pleads that such pharmaceutical colleges as have not already done so begin at once and in every department to teach, as far as yet evolved, the application of the discoveries of Pfeffer, Van't Hoff and Arrhenius to the lessons they are giving. They should let no occasion pass where it is possible for them to clearly trace the laws governing solutions without pointing them out. When the human mind can string its facts upon principles, the task of memorizing changes from slavish drugdery to keen appreciation and its accompanying pleasure. Facts, too, that cohere on a common principle cannot easily be forgotten. The student becomes master of them instead of remaining for ever their cringing slave. The chief universities of Great Britain, France and Germany, our own Columbia University of New York, and the almost peerless Johns Hopkins of this city of Baltimore, have in chemistry, physics and medicine accepted the doctrine of Arrhenius as sound science. They are experimentally working out its implications along the lines in which they are especially interested, and, while this incidentally benefits pharmacy, it does not do for it what pharmacists could do if they would follow the clearly indicated route.

Our colleges of pharmacy have a wonderfully fertile field here before them, if they can be persuaded to cultivate it. Those of them who have not adopted the new doctrine are no doubt still telling their students in chemistry that water is a good conductor of electricity, a statement that is now known to be false—it is practically a non-conductor. (Theoretical Chemistry, Nernst, Palmer, page 593). They are probably also telling them that carbon monoxide and oxygen form an explosive mixture when an electric spark is passed, when the new doctrine has led to the discovery that a vapor containing hydrogen must be present. (Ibid., page 576.) It is also likely that they often speak of the double salts of platinum with the alkaloids or alkaline metals, when they refer to the simple salts of hydrochloro-platinic acid. (Ibid., page 454). If they at all refer to the molecular weights of starch, arabic acid and other colloidal substances, it is more than likely that the number given must be multiplied by hundreds to be right. (Ibid., page 343). In writing such simple equations as sodium hydrate plus hydrochloric acid, they will still give it as $NaOH + HCl = NaCl + H_2O$, when in fact the reaction is $Na + OH + H + Cl = Na + Cl + H_2O$. (Watt's Dictionary, Vol. IV., p. 189). It is entirely wrong to teach that neutralization in water is a combination of the constituents of the salt. It is a combination of the constituents of water. When students are shown the so-called electrolysis of water and taught that it is the water that the electricity acts upon and decomposes, they are being taught what is not true. It is the dilute sulphuric acid that is being electrolyzed. (Ibid., p. 177). Students are told that the so-called strong acids and strong bases form salts that are held together by powerful bands of affinity. The reverse is found to be the truth. These are held by almost the weakest bonds known to the chemist. (Ibid., p. 178). The usual explanation of the action of indicators in acidimetry is wholly unlike the new one now used by advanced chemists. (Foundations of Analytical Chemistry, Ostwald, p. 118; The Theory of Solution and its Results, Morgan, p. 62). When medicines like bromide of potassium and alkaloids are advised to be administered in the form of elixirs or alcoholic solutions, such advice is contrary to the new doctrine of electrolytic dissociation.

These are but a few of the errors that are being inculcated by those not familiar with the new doctrine. It is quite likely that when the law of solutions is studied in relation to other liquids than water, some startling revelations will be made in our conceptions regarding tinctures, fluid extracts, elixirs, etc. This work belongs to pharmacy, and it is not likely that it will be undertaken outside the ranks of pharmacists. (Theoretical Chemistry, Nernst, Palmer, page 592.) Until it is done we will know practically nothing of the how or why of the many things we should know regarding the formation of precipitates in fluid extracts and of the principles involved in percolation. Such an investigation would quickly give a correct answer to the question concerning the advisability of using other liquids than alcohol for percolating drugs. The field for investigation that is opened up here is simply immense. Why cannot our college professors encourage young men who are about to graduate to take up such lines of investigation for the purpose of gaining the material for their theses? Of course they cannot do so until the new pharmacology becomes a prominent part of the teachings of their professors. All the work that has been done with water should be repeated with alcohol, chloroform, ether, benzol, toluol, carbon disulphide, and other liquids. Students that are not far enough advanced to enter with confidence a field so entirely new can find an abundance of work to do in unraveling some of the tangled skeins that still exist in working out the facts concerning aqueous solutions. There is a multitude of implications that any bright student can see and that no one has yet attempted to work out. Take for instance the extracting of alkaloids by immiscible solvents. This is certainly a good subject for a student of pharmacy to work upon. Professor Ostwald of the University of Leipzig says of this: "We may look forward to the methods of separation by extraction by means of solvents, e. g., with regard to the alkaloids, becoming further elaborated than they are at present. More particularly we may expect distinctions to be drawn between a strongly acid solution (hydrochloric acid) and one weakly acid (acetic acid plus sodium acetate), of which the one will retain the substances that can be extracted from the other." (Foundations of Analytical Chemistry, Ostwald, McGowan, page 90).

Along the same line lies the question of the conditions which cause different solvents to dissociate substances to a different degree. Work in this direction will be of great value and must bring valuable results to any one who undertakes it. In Watt's dictionary it is suggested that it may be due to the ionization of the solvent itself (Watt's Dictionary, vol. iv, p. 196). In the field of structural chemistry there is a large opening for the ambitious to make a scientific reputation with work that is not very difficult or complex. The new principles show how to tell double salts from salts of complex acids. In Watt's dictionary we are told that "the study of such cases has as yet scarcely been begun, because until now we possessed neither theoretical nor experimental means for answering the questions which arise. The electrical methods, in conjunction with the methods for the determination of molecular weights arising out of the theory of solutions, now afford easy access to these hitherto closed and uncultivated domains" (Watt's Dictionary of Chemistry, vol. iv., p. 197). Will our students of pharmacy be encouraged by our professors of pharmacy to take the hint and begin the cultivation of this rich domain? The questions that can be solved by following the indications of these new principles constitute a veritable Klondike for discoverers.

The doing of the kind of work here referred to would likewise prepare the student for still more ambitious effort in the field of organic chemistry. The properties of organic acids and the space relations of their atoms can now be studied along the vista that the theory of solutions has opened up. Here at least is work that will satisfy the most vaulting scientific ambition, and in which fame can certainly be secured by a large number of hard workers. (Ibid., pages 200 to 208). The study of viscosity in liquids is another subject that awaits the advent of some one willing to follow the cues of the new theory of solutions. (Ibid., p. 271). The cause of valence and its variability has been a subject of deep concern to chemists for a long time, and there are very few students who have not tried to unravel the difficulties attached to it. Ostwald and Nernst show that there are cues pointing toward a line of investigation that may set us straight on the matter. (Outlines of General Chemistry, Ostwald, p. 200; Theoretical Chemistry, Nernst, pp. 245, 312). Professor Nernst, after telling us that "salts having the same positive ion, when in the same degree of concentration, conduct equally well," and that the "conductivity increases in proportion to the square root of the equation," in agreement with the theory, goes on to say that "the development of this side of the theory deserves the utmost consideration, for it may, perchance, serve as the bridge to connect our views regarding ions which are electrically charged with the electro-magnetic theory of light." (Theoretical Chemistry, Nernst, p. 329.) Here certainly is a grand opportunity for some one with the scientific trend and the leisure time to devote to it.

Prof. Nernst likewise points out that "the study of the question regarding the dependence of the property of ionization on the nature of the solvent, would doubtless afford much information respecting the nature of electrolytic dissociation." (Ibid., p. 328). When referring to the magnitude of the electric charge on ions he says: "This question, although interesting in many respects, has not yet been subjected to a systematic examination." (Ibid., p. 339). It has been found that in some solvents some molecules are double, in others they are normal, while in still others they break up into their ions. Prof. Beckmann has drawn up a scheme of the different solvents for certain salts, showing how they may be classified in this way. A confirmation of Beckmann's work, and also an extension of it, together with a study of why different solvents behave in this way, is desired. (Ibid., p. 387). Professor Nernst, in dealing with the mutual solubilities of liquids, says that "for each temperature there is a corresponding solubility of the one in the other, and conversely of the other in the one. The connection between these two mutual solubilities has not been explained as yet. Only a few facts are known experimentally regarding them." (Ibid., p. 411). Here then is another field for investigation.

But why multiply examples? The new theory has shed such a flood of light into hitherto unknown regions that one can scarcely look into pharmacy or chemistry without seeing its beckoning hand calling us along. It will be a great pity if pharmacists do not take hold and win honor for themselves and their profession in such work. The American Pharmaceutical Association sends out its annual lists of queries to its members. If this kind of investigation should be mapped out for the Scientific Section, and all or a majority work along these lines where discovery is certain, and where the discovery of each will aid and dovetail in with the discoveries of all, two years' effort is likely to bring better results than a dozen years where there is no distinct system pursued or common object sought. Lately a number of our colleges have been giving post-graduate degrees. So far as can be ascertained, these are given only because the candidates have studied an additional year in the same class of studies as they pursued during under-graduate years. Why this policy has been adopted, it is hard to tell. Scientific post-graduate degrees in the universities are only given for original research; and as pharmaceutical colleges are scientific colleges, they should adopt the same course, and indeed they should never have departed from it. There is no other conceivable test of a man's ability, and therefore worthiness, for a doctorate degree in pharmacy than the original work he has done in advancing pharmacology. The man who cannot point to some distinct discovery that is the outcome of his own protracted, original research, should never receive the degree of Doctor of Pharmacy. To give it to others is to disgrace it, and to persist in so giving it is to finally make it the laughing-stock of the world of science. Never in the world's history was there a more propitious time for our colleges to adopt the giving of post-graduate degrees, as is shown by the brief outline of work so easily made productive that is mentioned in this paper. If, however, the degree is mainly to be used for the decoration of politician pharmacists, and not as a guarantee of scientific ability, the curtain will soon be rung down on a howling farce, the like of which was never before seen on the stage of pharmacy. Let the folly cease, and make the degree an evidence of ability in original research.

Great as is the benefit of the new pharmacology to the post-graduate, it is really of greater benefit to the under-graduate whose professor keeps it in his mind during teaching hours. To attempt to show all the new ideas it has injected into practical chemistry would take more time than this

Section would be willing to place at my disposal. All I can possibly do now is to refer to some of the prominent subjects it has illuminated, difficulties it has overcome, and problems it has solved. To stop to show how it has solved them would also consume more time than there is at my disposal. With each statement, however, will go a reference to the place where the subject can be found and studied by all interested in the matter. Probably one of the most interesting explanations of the new theory of solutions is that of what constitutes "strength" in relation to acids and bases. ("Theoretical Chemistry," Nernst, pp. 437, 439, 440). In connection with that is the reason why the heat of neutralization is always found to be exactly the same as the heat of the water formed during neutralization (Watt's Dictionary of Chemistry, Vol. IV., p. 189), and the change of volume that occurs after neutralization is exactly equal to the amount of water formed (Ibid., p. 190). Closely related to these is the explanation of how indicators act in titrating volumetric solutions of acids and alkalies ("Foundations of Analytical Chemistry," Ostwald, p. 118; "Theoretic Chemistry," Nernst, p. 441; "Theory of Solution and Its Results," Morgan, p. 62), and why carbonic acid can be titrated as a monobasic acid with phenol-phthalein as an indicator. ("Foundations of Analytical Chemistry," Ostwald, p. 123).

Of possibly equal importance is the new way of taking molecular weights, particularly of non-volatile substances and of substances that decompose on volatilization, and that could not therefore be taken by the old methods. ("Theoretical Chemistry," Nernst, p. 148). The new theory shows why chemical reaction goes on better in aqueous solutions than in solutions of any other liquid (Ibid., p. 328); why syrup is a bad conductor of electricity and dilute mineral acids or their salts good ones (Ibid., p. 309); why the osmotic pressure in dilute solutions of hydrochloric acid is twice as great as in dilute sugar solutions (Ibid., p. 310); why dilute solutions of sulphuric acid have three times as much osmotic pressure as those of sugar (Ibid., p. 311); why a solution of $FeCl_3$ gives an osmotic pressure four times as great as sugar (Ibid., p. 312); why pure water and other pure substances cannot conduct electricity (Ibid., p. 593); why fused salts at high temperatures become conductors (Ibid., p. 593); why the freezing point varies in different aqueous solutions ("Outlines of General Chemistry," Ostwald, p. 136); why acids act as catalytic bodies in reducing sugar, etc. ("Foundations of Analytical Chemistry," Ostwald, p. 72); why alkaline metals show no anomalous reactions (Ibid., p. 124); why it is generally difficult to establish chemical reactions in organic compounds ("Watt's Dictionary of Chemistry," Vol. IV. p. 184); why a solution of magnesium sulphate with sodium chloride if evaporated at ordinary temperature will dry out as magnesium chloride and sodium sulphate, whereas if it is evaporated at a high temperature, it dries out just what it was when put into the solution ("Outlines of General Chemistry," Ostwald, p. 276); why iron immersed in a solution of copper salt will become coated with metallic copper ("Theorectical Chemistry," Nernst, p. 612); why solutions of salts conduct electricity and solutions of many organic compounds do not ("Watt's Dictionary of Chemistry," Vol. IV., p. 191); why iron in potassium ferrocyanide does not give a black precipitate with ammonium sulphide, and why chlorides react for chlorine with silver nitrate ("Outlines of General Chemistry," Ostwald, p. 276); why the affinities of acids increase four or five fold on their passage from normal to decinormal solutions (Ibid., pp. 346, 347); why more esters are formed with acids in some solutions than in others ("Theoretical Chemistry," Nernst, p. 388); why weak or moderately strong acids act more feebly in the presence of their own natural salts ("Foundations of Analytical Chemistry," Ostwald, pp. 64, 65); why galvanic currents are produced during chemical action ("Theoretical Chemistry," Nernst, p. 615); why valency is greater at a high than at a low temperature ("Outlines of General Chemistry," Ostwald, p. 200); why substances change their color, taste, conductivity and other properties by dilution in solutions ("Watt's Dictionary of Chemistry," Vol. IV., p. 188).

These examples are probably enough to show something of the scope of the light shed by the new theory and to guide those interested to where they can learn more concerning it. When better developed it will give us a clear insight into the nature of incompatibilities so that we will in a more rational manner be able to foresee and overcome them better than now. Only a beginning has been made in this direction, but it is quite promising.

Mr. A. R. L. Dohme moved that the papers of Dr. Eccles be received and take the usual course, and that a vote of thanks be extended to him for the great labor expended on them and the excellence with which they were prepared, which motion was duly carried.

The Chair called for nominations for officers for the ensuing year, and Mr. Selzer nominated for Chairman Mr. Joseph Feil, of Cleveland. Mr. Caswell A. Mayo, of New York, was also nominated for Chairman.

Dr. Eccles nominated Mr. Caswell A. Mayo for Secretary, and Mr. Selzer nominated Mr. Feil for the same place.

On motion, the Section then adjourned to 3 o'clock p. m.

SECOND SESSION—FRIDAY AFTERNOON, SEPTEMBER 2, 1898.

The Chairman called the Section to order at 3 p. m.

On motion of Mr. Feil, the reading of the minutes of the previous meeting was dispensed with.

Mr. A. R. L. Dohme read a paper upon "The Desirability of Incorporating Pharmacology in Courses at Pharmaceutical Colleges."

THE DESIRABILITY OF INCORPORATING PHARMACOLOGY IN COURSES AT PHARMACEUTICAL COLLEGES.

BY ALFRED R. L. DOHME, PH. D.

Before surmounting the obstacles in the way of establishing the above suggestion which consist mainly in "let good enough alone," and "the student and the college already have as much as they can successfully handle," let me enter to some extent into the nature of this pharmacology. At the Philadelphia meeting in June, 1897, it was my pleasure to present to the Section on Materia Medica and Therapeutics of the American Medical Association, a paper entitled, "Pharmaceutic Chemistry, Pharmacology and Pharmaco-Physics the Natural Stepping-stones to Scientific Medicine." In this paper I pointed out the distinction between the three subjects embraced in the title and between pharmacology and therapeutics. Some little confusion has arisen recently because of the double use of the word pharmacology, and the dictionaries do not help us out in the matter. They define pharmacology as the study of drugs, both as to their recognition, properties and therapy. In other words, it is a general term for the study of drugs and their therapy, or a combination of pharmacy, the science of compounding drugs, with materia medica, the description of drugs and their medicinal effect. This is in accordance with the derivation of the word, which is made up of the Greek words pharmakon and logos, meaning a discourse on or a study of drugs. However, the word has also been used, especially in Germany, to mean the study of the physiologic effect of drugs on the human system. Thus, when acetanilid is taken into the stomach and produces certain results or effects, it is the province of pharmacology to study and explain what organs, tissues, fluids, etc., of the body are affected by the same, and in what way. Pharmaceutic chemistry has to do only with the chemistry of drugs, *i. e.*, given a drug, say belladonna root, it is the province of pharmaceutic chemistry to discover entirely what the same contains and in what relative quantities, thus: atropine, hyoscyamine, hyoscine, starch, resins. Pharmacognosy is the study of the physical properties of the drugs and their history. Pharmacodynamics is the study of the effect and uses of drugs, and is the same practically as therapeutics. Pharmacology is the study of the physiologic effect of the constituents of the drug, and pharmaco-physics, the cause of the effects of the drug upon the organs, etc., from the standpoint of the drug itself. Therapeutics is the study of the efficiency and value of drugs for various diseases; so that the therapy of buchu is that it is an efficient diuretic, and has proven valuable as an aid to combat certain conditions of the body in certain diseases. It has nothing to do with causation but only with effect, the causation being the province of pharmacology and pharmaco-physics. So much for terminology. Let us next consider the pros and cons in regard to the desirability and value of pharmacology as a study for pharmacists; and as it is preferable to surmount obstacles at the beginning rather than at the end of an argument, let us first take up the cons and begin by enumerating them.

1. The student already has abundant material for study in the present usual course in pharmacy for the degree of Ph. G.; 2. The subject is not germane to pharmacy, and belongs to the medical rather than to the pharmaceutical college; 3. Students spend enough time away from the drugstore already, and if another course is added, they had better stay away altogether, and only enter the pharmacy after they have graduated or before they enter college; 4. Pharmacology can never be of much practical value to the pharmacist, and would rather be a burden than an aid to him; 5. Pharmacology is more a theoretical than a practical science, and the pharmacist needs practical subjects, and 6. If courses of pharmacy are made too elaborate and advanced, the number of students would be apt to decrease and thus interfere with the pecuniary success of the college and its faculty.

Let us combat the first con. Unless colleges of pharmacy be considered as pharmacist factories, that can turn out the most pharmacists in the least time, we must admit that all knowledge that pertains to drugs and will cement closer the relations of pharmacist and physician, is desirable matter for a student of pharmacy to master. The nineteenth century is progressive, and the twentieth will be more so, and progress means extension of knowledge and improvement of conditions. Those colleges that are pharmacist factories will not survive, because they are not the fittest; for they cater to the purely commercial side of pharmacy, and, if I may be permitted the expression, prostitute the science; for their promoters are in the business for what there is in it for them. For such colleges, pharmacology would, to be sure, be a burden and an obstacle.

The colleges that teach pharmacy for pharmacy's sake will, no doubt, welcome a branch of their science that tends to elevate it and, at the same time, make it more and more the associate of its kindred science, medicine. Pharmacists come daily in contact with physicians, and strive to cultivate their friendship and their trade, and hence should know something of medicine to argue and counsel with the physician. Of course all pharmacists need not be, and do not desire to be, at the same time physicians; but they can, with distinct advantage to themselves and the physician, perhaps be acquainted with the physiological effect of the various drugs which they handle. Most pharmacists soon acquire, be it from reading prescriptions or discoursing with physicians, a more or less complete knowledge of therapeutics, and it aids them in deciphering prescriptions or discovering therapeutic incompatibilities. Why should they not then become proficient in the scientific pharmacology, rather than superficially acquainted with the empirical therapeutics?

A practical example will perhaps bring this out plainer—let us take nux vomica. If they knew the pharmacology of nux vomica, they would know that the ingredients of this drug act in a certain way, and produce a certain result upon certain organs, tissues, and functions of the body, and that for certain diseases, or for admixture with certain other drugs, it would not be indicated, for it would either counteract certain effects upon certain organs, or counteract the effect of the other drugs mixed and dispensed with it. In this they could advise and confer with the physician, and in many cases be of great assistance to him, as well as prevent the possibility of the dispensed medicine, by virtue of its therapeutic incompatibility, being ineffectual, and the cause of this attributed to the pharmacist. We can see now that pharmacology is not an onus in a course of pharmacy or to a practicing pharmacist, and further that being a desirable and cognate branch of the science, its study cannot be considered a waste of time. As a matter of fact, students of pharmacy have not too many subjects in their courses at college, for they only have five: pharmacy, chemistry, botany, materia medica and microscopy; while medical students have as many as fifteen, viz., surgery, pathology, physiology, materia medica, bacteriology, obstetrics, anatomy, chemistry, eye and ear, dermatology, hygiene, diseases of children, diseases of women, pediatrics, and others: lawyers have about ten, and preachers about as many. Unfortunately students of pharmacy do not, like any and all the others, spend all of their time at study; but this is unfortunate, and should not be so, and in those colleges in which it is not so, the study of pharmacology will very soon find a place. That pharmacology is germane to the study and practice of pharmacy follows from what has already been said.

The present courses of our colleges enable a student to recognize drugs, know the chemistry of all the chemicals they use and of many of the vegetable drugs, and know the doses of them and how they can be manipulated to produce from and with them palatable, sightly and permanent mixtures. Why should they not know the effects of these drugs physiologically speaking, and thus enable them to judge of the physiological compatibility and hence of the total perfection of the prescription they are dispensing? Of course pharmacology belongs also to the medical course of study, but almost if not fully as much to the pharmaceutical course of study.

The third objection I have noted is a valid one to those who adhere to the four years experience requirement, for the addition of courses of study could not give the student very much time in the drug store, especially as pharmacology would require a laboratory course with the lecture work. But it is becoming more and more apparent every year that pharmacy is destined to out-grow the practical experience requirement, and for those colleges and students and preceptors who favor the abolition of this requirement for graduation the advent of the science of pharmacology would be, I fancy, not undesirable.

The fourth objection has been met when the advantages to the pharmacist were pointed out above.

The fifth condition is a very pertinent one, and is in a measure valid, for although pharmacology is a growing science it is in its early stages of growth and needs fostering. The crying need of the day in this country is facility for studying the physiological effects of new remedies and compounds; and if a newly discovered compound is to be added to the armamentarium of the pharmacist and physician, why should its pharmacology not be elucidated in pharmaceutical laboratories, as well as its chemistry and pharmacy? When pharmacology and pharmacophysics are mature sciences, the advent of elegant pharmacy will be chronicled, for we will then have scientific remedial agents. By this I mean we will not have remedial agents that, while they possess undoubted virtue to combat certain symptoms and conditions, at the same time also possess certain virtues which affect other portions of the human body unfavorably, and, while curing the one, disease the other. To what extent this is going on to-day none of us know, but that it is going on none of us can well doubt. We will then know to what part of such substances, or more technically speaking, to what group or radical of such compounds the unpleasant effect is due, and we will strive to replace it by a group or radical that, while not detracting from the desired positive and main effect, at the same time avoids the unpleasant side-effect. When this condition of affairs obtains we will have reached the desired stage of elegant pharmacy. If our colleges of pharmacy have courses in pharmacology, and its accompanying laboratory work, they will be contributing very largely toward the attainment of elegant pharmacy, and incidentally to the development of their science and to its ennoblement.

The sixth objection is also a valid one, for the evolution and growth of the science of pharmacy must keep out of it a large number who would and do enter upon it because it is easy and requires but few hours of work, with promise of a good living as the outcome. But it seems to me that this objection, though valid, is a good argument for the incorporation of the subject into college courses, for I do not think I stand alone when I affirm that there are to-day too many pharmacists in this country. Most pharmacists realize that whereas formerly their clientele extended over a certain territory and included a certain number of families, this has gradually been more and more reduced as new stores open in various parts of the territory and claim their share of the families as customers. Our country to be sure is growing, but not in the same proportion that the number of pharmacists is growing, and unfortunately for us all this proportion is growing greater and greater every year. Every year records a greater number of graduates in pharmacy than the previous one, and this apparently will continue for some time to come. If the advent of courses in pharmacology, secretionary analysis, and above all more advanced preliminary requirements for entering college, will check this growth in the birth-rate of pharmacists, is it not helping every pharmacist to some extent and many to a very considerable extent? To sum up the favorable reasons for including pharmacology in courses of pharmacy which have already been given above, they are: it broadens and completes the knowledge of drugs; it brings pharmacist and physician in closer touch; it tends to decrease the number of pharmacists by making the course more extensive and perhaps also more difficult; it develops the science of pharmacology, which is a decided step in the line of pharmaceutical and medical advancement; it opens up a field of work for pharmacists that gives them additional chances for making a reputation and earning a living; and finally, it tends to elevate the science by enlarging the field of the same and introducing an additional cognate, growing and probably important science, one that will develop into more and more prominence and importance as time rolls on, and pharmacy and medicine develop by following the natural laws of evolution.

Baltimore, August 22, 1898.

THE CHAIRMAN: Unless there is objection the paper will be considered as received and referred, and is now open for discussion.

DR. RUSBY: There is a branch of science which includes the following subjects: the origin of the drug; its identification, selection and estimation; its chemical examination and isolation of its constituents; its preparation for use; its physiological action and its therapeutical use. In other words, this branch includes everything relating to a knowledge of this drug. Has the author any name to apply to this branch of science? To me it seemed that "pharmacology" was the term which should be employed and which had originally been so employed, and that it was not in order to now substitute for it a new and restricted meaning.

I am heartily in favor of the study by pharmaceutical students of the physiological action of drugs and medicines. I believe that they cannot know too much of it, and that it is desirable that it be established as a separate chair in colleges of pharmacy. I do, however, deprecate the use of the name "pharmacology" for this branch, believing that a new name should be found for it.

DR. WHELPLEY: Unfortunately I was not present at the reading of the paper, but I have been much interested in the subject of nomenclature relative to our department of study, that is, pharmacy; and I have reached the same conclusion that Dr. Rusby has relative to a word that embraces everything about a drug, that is, "pharmacology." I have been unable to find a broader term.

I have always taken pains to impress upon pupils that they should consider a knowledge of the subject with regard to its natural subdivisions—that they should fix it in their minds, so that when they read or converse with some one using different terms and definitions they will at once recognize the application of the different words by their knowledge of possible sub-divisions of the subject.

Now, a word about the body of the paper: I feel like adding words of praise to any efforts in the direction of insisting upon education that will broaden the plane of pharmacy—make more smooth the way that exists between pharmacy and medicine. We know that the average doctor has an idea that he knows all about the drug business; and the question may be asked, why should he not? why can not he dispense the prescriptions that he knows how to write? We know also that one reason for his ignorance on that subject is, that he looks upon drugs as individual articles, without a thought as to their origin, composition or relation to each other. That becomes less true as the doctor becomes better educated, until you reach the physician who understands pharmacy as well as medicine. Then you have a doctor who hesitates about dabbling in pharmacy. On the other hand, we meet with the pharmacist who is ever ready to dispense and prescribe. Because he knows that a certain drug is an antipyretic, and a man has a fever that ought to be reduced, he will prescribe that for him. He knows that other drugs are cathartic. He does not recognize the many classes of antipyretics, and that an antipyretic suitable in one case would not be in another; and the same with cathartics. So that the proposition to broaden the course of pharmacy is simply a proposition to make us, as pharmacists, broader men and women, and consequently more careful and considerate of our fellow-laborers, the physicians. If the circle of knowledge is increased in pharmaceutical and medical colleges we will finally meet on common ground that we will both understand, and each will respect the other, and the more we will find both medicine and pharmacy advancing hand in hand and arm in arm. That being the case, I most heartily approve the attempt and purposes of the paper Dr. Dohme has presented.

The amplification of branches in colleges of pharmacy and the arrangement of the curriculum must vary in different institutions. One college may favor certain branches, and another other branches; still, the two institutions may teach practically the same thing. The same way with medical colleges. The more colleges you investigate the more branches you will find not universally taught in all; however, the sum total of the instruction may be the same. So that while Dr. Dohme has reeommended this as a separate chair, it may not be immediately adopted as such; at the same time I believe that many colleges of pharmacy are teaching in that direction—teaching part, if not all, under different heads and in different parts of the curriculum. I trust that my remarks will not be construed otherwise than as favoring the establishment of such a chair in our colleges as soon as that is practicable. I only want to call attention to the fact that many of these things are already taught by many of the different departments. I heartily endorse the paper.

Mr. Kremers: By way of analogy permit me to call attention to the changes which the terminology of other sciences has undergone. "Petrography," *e. g.*, was long used by geologists as applying to that branch of their science pertaining to the *description* of rocks, much as the term "Pharmacographia" was used by Fluckiger and Hanbury; also by Dimock, Warden and Hooper, when they applied it to works on drugs that were largely descriptive. However, when, with the application of mathematics, physics and chemistry, petrography passed more out of the merely descriptive stage and became more and more an exact science, the term "petrology," the *science* of rocks, was substituted for that term which was indicative of its early age.

In the same manner it seems highly proper to substitute the term "pharmacology" for "pharmacography," as the latter passes more and more out of the mere descriptive into the more scientific stage.

One important matter, however, must not be overlooked, and that is the broader meaning and the more restrictive meaning in which terms are unfortunately used. So, *e. g.*, the term "medicine" is used in a broad sense, covering all the medical sciences and the healing arts. At the same time it is used in the restricted sense, as is evidenced by almost any college curriculum. "Materia medica," originally meaning medical material, has become the name of the science of the material, and has been used in a broad sense covering all that pertains to medicine. To-day it is used mostly in a restricted sense, and here even may mean one thing or something else quite different. So the term "pharmacology," whereas its use in the broad sense as the science of drugs is perfectly legitimate, is used by the Germans almost exclusively in the more restricted sense, viz.: for the science of the physiological action of drugs.

MR. A. R. DOHME: I was about to make practically the same reply to Dr. Rusby's question that Dr. Kremers has made in stating his view of the subject. The term "pharmacology" was taken directly from the German word "pharmakologie," and was generally adopted in this country for the physiological effect of drugs upon the organs, etc., of the body. I being also a student of geology under Prof. Rosenbush, of Heidelberg, had occasion to note his authoritative distinction between "petrography," the description of the science of rock study, and "petrology," the science of the action of rocks upon one another, their changes, and the study of the same. That is, "-ography" was a descriptive title, and "-ology" the active or scientific title. Hence, I would answer Dr. Rusby's question by saying that "pharmacography," rather than "pharmacology," would be what I would suggest for the general title for the science of everything pertaining to drugs.

MR. REMINGTON: It seems to me that there is no question about these two words. It is a question of the termination "ography" or "ology." We speak of "geography," which is a description of the earth's surface. "Geology," on the other hand, is the *science* of the earth, so to speak. So we have it all the way through. I think the terminal difference gives us a good line of demarkation. Whenever the termination "ology" is used, a much broader sense is indicated.

Mr. Coblentz presented and read a paper on "A Study of Nomenclature for Synthetic Compounds." He accompanied the reading of the paper with some interesting blackboard illustrations of his subject. He confessed his inability to accurately state the origin of some of the terms used, and some of his conjectures as to origin were decidedly humorous. He said, for instance, that "Loretin" must have been derived from the name Laura, probably a daughter of the proprietor; and that "Lorenit" must have been derived from "Laura-nit," to show that it was not identical with the first preparation.

CAN A SYSTEM OF NOMENCLATURE BE DEVISED FOR THE MODERN MEDICINAL PREPARATIONS WHICH IS CONCISE, EXPRESSIVE AND ADAPTED TO THE WANTS OF PHARMACY AND MEDICINE?

BY VIRGIL COBLENTZ.

When we consider that scarcely fifteen years ago synthetic medicinal remedies were practically unknown, and that now we have as a conservative estimate at least 1200 of such, we cannot but realize that the subject is beginning to assume gigantic proportions. Each year ushers in an ever-increasing number; so, if this rate continues, the subject may be, in a few years, beyond comprehension and control.

Although but a comparatively limited number ever reach the attention of the physician and come into use, the subject is still an expensive and perplexing one to the wholesale and retail druggist.

Were the remedies solely confined to what is known as the true synthetic compounds, the subject would be far simpler and more readily grasped, but with the advent of proprietary concoctions the subject is rapidly becoming ridiculous.

In considering this subject of nomenclature, the former group will be considered separately, although both have of necessity been classed together in our various books of reference.

GROUP I.

True synthetic medicinal remedies* are such chemical compounds as have been built up from elementary or simpler bodies with a view of introducing certain organic groupings which clinical experience has demonstrated to produce certain medicinal effects.

This subject was primarily introduced through O. Fischer's Kairin (a quinolin derivative), in 1882, it being the result of the study of the constitution of quinine. The theoretical possibilities of Kairin induced Knorr's synthesis of antipyrine in 1884, which was based largely on deductions drawn from the constitution of quinolin derivatives.

The accidental discovery of the medicinal properties of acetanilid (antifebrin), in 1887, not only dates more properly the influx of modern synthetic remedies, but also a general invasion of the proprietary combinations.

GROUP II.

Proprietary combinations are chiefly mixtures or combinations of true synthetic medicinal products, with various adjuvants, these serving the purpose of assisting or modifying their medicinal action. The cheapness of antifebrin, in conjunction with its valuable antipyretic properties, led to the introduction of various combinations of this with such substances as sodium bicarbonate, citrated caffeine, ammonium carbonate, etc., under such titles as *Antikamnia*, *Phenolid*, *Exodyne*, *Antisol*, *Pyretin*, *Phenatol*, *Kaputine*, *Phenalgene* and the like. As is well known, acetanilid alone frequently produces distressing side symptoms ; these are avoided or modified by such combinations as above mentioned. The success and popularity attained by some of these was a signal for the introduction of a myriad of shot-gun combinations, among which we find not only antipyretics, hypnotics and the like, but remedies for piles, bed-wetting, sea-sickness, depilitants, adhesive plasters, bread raisers, ointment vehicles, and the like. While this latter class does not include any of the synthetic remedies in their composition, yet the *titles* employed belong to both of the preceding classes.

While no objection could be raised against the introduction of such preparations, we do protest against the flagrant misuse and violation of all rules and customs of nomenclature. Owing to the fact that the synthetic medicinal products are, as a rule, organic combinations, and generally of a very complex character, the subject of the selection of titles has become one of vast importance. In order to form an idea of the conditions existing, a selection of the more prominent remedies is presented for purposes of comparison. The titles of the various members of the different groups presented are divided into two classes, namely:

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* Or what is understood under the title of modern synthetic medicinal products.

CLASS I. CHEMICAL TITLES.

(*a*) Titles of this class express concisely the chemical composition of the compound, as, for example, Acet-anilid, Benz-anilid, Ethylene-diamine, Ethoxy-caffeine, Acetyl-ethyl-phenyl-hydrazine, etc.

(*b*) Such titles which embrace euphonic combinations of different syllables of the names of the bodies entering into the composition of the remedy. For example, Tann-albin (compound of tannin and albumen), Amyl-form (a combination of starch and formaldehyde), Sali-pyrine (a compound of salicylic acid and antipyrine), Lacto-phenin (lactic acid derivative of phenetidin), Gall-al (aluminium gallate), Gall-anol (gallic acid and anilid), etc.

CLASS II. DESCRIPTIVE TITLES.

These are especially coined euphonic titles, which are generally of Greek or Latin origin, and partake of a descriptive character. These titles describe in a way either the uses, properties or physical characters of the compound, as for example, *Pyoktanin* is made up of the Greek words *puon*, meaning *pus*, and *kteino*, *to kill; Thalline* from the Greek *thallos*, meaning a green twig, referring to the bright green color produced by the action of oxidizing agents.

Other titles are of an arbitrary character, such as Loretin, an adaptation from Laura, or Lorenit, in which the three last letters of Loretin have been reversed.

Owing to the entire absence of any data upon the nomenclature of these remedies, the derivation of many of these titles is entirely a matter of conjecture.

ALDEHYDES.

The well known antiseptic and bactericide Formaldehyde (H.COH) forms the basis of a large number of preparations and compounds. Among those of *Class I.* are:

Formalin (Formal or Formatol).—40 per cent. aqueous solution of formaldehyde.

Para-formaldehyde (Triformol) $(H.COH)x$.

Met-aldehyde $(CH_3.COH)_3$.—Hypnotic.

Sulf-aldehyde $(CH_3.CSH)_3$.—Hypnotic.

Thialdin $(C_6H_{13}NS_2)$.—Action of H_2S on aldehyde-ammonia. A heart stimulant.

Formaldehyde-casein.—Condensation-product of formaldehyde and casein.

Formo-pyrine $(C_{11}H_{12}N_2O.HCOH)$.—A compound of formaldehyde and antipyrine.

Tanno-forms.—Condensation-products of various tannins with formaldehyde.

Colla-form (Formacoll) (kolla=glue).—A dry compound of formaldehyde and gelatin.

Amylo-form (Amylum=starch).—A dry condensation-product of starch and formaldehyde.

Dextro-form.—A condensation product of dextrin and formaldehyde.

Chino-form.—A condensation-product of cincho-tannic acid and formaldehyde.

Amyl-iodo form.—A compound of starch, formaldehyde and iodoform.

Formyl-piperidin ($C_5H_{10}N.COH.HCl$).

Galloformin.—A compound of gallic acid and formaldehyde.

Among proprietary preparations of like-sounding titles we have:

Fermelin.—A diastatic bread raiser.

Formagen.—A dental cement.

Formatol.—Antiseptic dusting-powder containing formaldehyde.

Formolid.—Proprietary disinfectant.

Formochlor.—A disinfectant containing formaldehyde and calcium chlorid.

Formoform.—A mixture of formaldehyde, zinc oxid, starch and thymol, for perspiring feet.

Glutol and Glutoform.—Compounds of gelatin and formaldehyde.

No difficulty can be experienced in the distinctive character of the nomenclature of the various compounds of chloral (tri-chlor-aldehyde).

Chloral-Cyanhydrate, $CCl_3.CH(OH).CN$.—A substitute for HCN.

Chloral-Ammonium, $CCl_3.CH(OH).NH_2$.—A hypnotic.

Chloral-amide (Chloral formamide) $CCl_3.CH(OH).NH.COH$.—A hypnotic.

Chloral-imide $(CCl_3.CH:NH)_3$.—Hypnotic.

*Chloral | ose** $C_8H_{11}Cl_3O_6$.—Compound of chloral and glucose, of hypnotic properties.

Chloral-Oximes.—These are combinations of chloral with various oximes, which are intended as hypnotics:

Chloral-acetaldoxime.—$CCl_3.CH(OH).O.N:CH.CH_3$.
Chloral-acetoxime.—$CCl_3.CH(OH).O.N:C(CH_3)_2$.
Chloral-benzaldoxime.—$CCl_3.CH(OH).O.N:CH.C_6H_5$.
Chloral-camphoroxime.—$CCl_3.CH(OH).O.N:C_{10}H_{16}$.
Chloral-nitroso β. naphthol.—$CCl_3.CH(OH).O.NO.C_{10}H_6$.

Meta Chloral $(CCl_3.COH)x$.—Hypnotic.

Bromal Hydrate, $CBr_3CH(OH)_2$.—Hypnotic.

Butyl Chloral Hydrate, $CH_3CHCl.CCl_2.CH(OH)_2$.—Hypnotic.

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*The vertical line inserted here and elsewhere, is intended to illustrate the compounding of the title, chloralose being built up by uniting chloral and ose, the latter ending referring to the fact that a sugar is a constituent of this compound.

AMINES.

Class I.

Tri-methyl-amine $(CH_3)_3N$.—Used in rheumatism. A dilute aqueous solution of this is sold under the title of "*Aminal.*"

Tetra-methylium-hydrate $(CH_3)_4N.OH$.—Caustic.

Tetra-ethylium-hydrate.—$(C_2H_5)_4N.OH$. Caustic.

Tetra-allium-alum $(C_3H_5)N.Al_2(SO_4)_3,12H_2O$.—Uric acid solvent.

Propylamine, $C_2H_5.CH_2.NH_2$.—Chorea.

Ethylene Diamine, $NH_2.CH_2.CH_2.NH_2$.—Antiseptic.

Piperazine or *Pyrazine Hexahydrid* $(NH(CH_2 : CH_2)_2NH)$ belongs to the group of hydro-pyrazines.

Class II.

Spermine (*sperma* (σπερμα) = *seed*). A leucomaine which is found in the seminal fluid, chemically a di-methylene imine $(CH_2)_2NH$. Used in nervous diseases.

Lysidin. This title is an arbitrary one. Chemically an ethylene-ethenyl-diamine, used as a uric acid solvent.

Urotropin.—Arbitrary title. A hexamethylene tetramine.

AMIDES.

Class I. Aliphatic Amides.

Form | *amide,* $H.CO.NH_2$. The amide of formic acid, the mercury compound of which is antisyphilitic.

Succin | *imide,* $C_2H_4(CO)_2NH$ or succinylimide, a diuretic.

Ure | *thane* compounded from *ur (urea)* and ethane, the compound being an ethyl ester of carbamic acid closely related to urea. Sedative.

Urea (ouron (ουρον) = *urine).*—$NH_2.CO.NH_2$. Diuretic.

Thio | *sinnamine (theion* (θειον) = *sulfur, sinamoreo* (σιναμωρεω) = *to destroy).* The title refers to the bactericidal properties of this sulfur compound.

Creatin (kreas (κρεας) = *flesh)* a methyl glycocyamine, which occurs in muscular tissue. Used as tonic.

Methoxy-, also *Ethoxy-caffeine.*—Used for migraine. Fortunately other titles for these have not been introduced.

Class II.

Ural. Compounded from *ur* and *al,* the former two letters being taken from urethane, and the latter from the last two letters of chloral. A chloral urethane.

Somnal (*somnus* = *sleep*). A chloral urethane alcoholate. The title referring to its hypnotic properties. $CCl_3CH(O.C_2H_5).NH.CO.O.C_2H_5$.

Symphorol (*syn* (συν) = *together, phero* (φερω) = *to carry off*). The title refers to the diuretic powers of this sodium sulfo-caffeate.

AROMATIC AMIDES.

Class I.

Acet | anilid or *Phenyl-acetamide* ($C_6H_5.NH.CO.CH_3$) are the correct chemical titles for this compound of acetic acid and aniline. The synonym antifebrin is derived from "anti" (αντι) *against*, and "febrilis" *a fever* thus signifying its medicinal properties.

Benz | anilid ($C_6H_5.NH.CO.C_6H_5$).—A phenyl-benzamide.

Form | anilid ($C_6H_5.NH.COH$).—A phenyl-formamide.

Anili | pyrine.—A condensation product of one molecule of acetanilid and two of antipyrine.

Acet-ortho-toluid, $C_6H_4(CH_3).NH.CO.CH_3$).—Ortho-tolyl-acetamide.

Meth | acetin ($C_6H_4OCH_3.NH.CH_3CO$).—Para-methoxy-acetanilid.

Class II.

Antisepsine (*anti* (αντι) = *against* and *sepsis* (σηψις) = *a poison*).—An antiseptic and antipyretic. Chemically a parabromo-acetanilid, $C_6H_4.Br.-NH.CH_3.CO$.

Unfortunately for antisepsine and also for us, we have three preparations (not chemical compounds) which have similar-sounding titles.

Antiseptin (Radlauer).—An antiseptic containing thymol, zinc sulfate and boric acid.

Antiseptin.—A wood preserver consisting of a solution of sodium silicate and mercuric chlorid.

Antiseptol.—An antiseptic powder, consisting of cinchonine-iodo-sulfate.

Antiseptikon.—A dental antiseptic.

Exalgine (*ex* = *from* and *algos* (αλγος) = *pain*). An anti neuralgic. Chemically, methyl-acetanilid, $C_6H_5N.(CH_3).CH_3.CO$.

Iatrol (*iatreuo* (ιατρευω) = *to heal*). A non-toxic antiseptic, said to be an oxy-iodo-methyl anilid.

Amido-derivatives of Phenol.

The following synthetic preparations are all derivatives of para-phenetidin $\left(C_6H_4 \begin{matrix} \diagup OC_2H_5 \\ \diagdown NH_2 \end{matrix}\right)$ in which one or both hydrogens of the amido (NH_2) group are replaced by various organic residues. The introduction of such acid residues materially lessens the toxic antipyretic properties of phenetidin. The title of several members of this group consists in combining the name of the acid, entire or in part, as a prefix or suffix, with "phenetidin," "phenin" or "phen," for example:

Class I.

*Phen*acetin, $C_6H_4.(O.C_2H_5).NHCH_3.CO$.—Acet-p phenetidin.

*Phen*ocoll, $C_6H_4.(O.C_2H_5).NH.CO.CH_2NH_2.HCl$.—Glycocoll-p-phenetidin-hydrochlorid.

(Salocoll = phenocoll salicylate.)

Citro*phen*, $C_6H_7O_7(C_6H_4(OC_2H_5)NH.CO)_3$.—A compound of citric acid and p-phenetidin.

Lacto*phenin*, $C_6H_4(O.C_2H_5).NH.CO(CH(OH)CH_3)$.—Lactyl phenetidin.

Amygdo*phenin*, $C_6H_4(O.C_2H_5.)NH.OC.CH(OH).C_6H_5$.—Obtained by action of mandelic acid on p-phenetidin. Mandelic acid was first obtained from amygdalin.

Gluco*phenetidin*.—Condensation product of glucose and p-phenetidin.

Class II.

Kryofin (*Kryos* (κρυος) = *cold*, *phero* (φερω) = *to carry*).—The title refers to its fever-reducing properties. Chemically kryofin is a methyl glycolic phenetidid, $C_6H_4.(O.C_2H_5).NH.O.CH_2CO$.

Malakin (*malakos* (μαλακος) = *mild* or *soothing*).—A salicyl phenetidin $C_6H_4(O.C_2H_5).N : CH.C_6H_4.OH$.

Malarin.—The title refers to the anti-malarial properties of Acetophenone-phenetidin citrate, $C_6H_4.(OC_2H_5).N : C(CH_3)(C_2H_6)$. C. Ac.

Sedatin (*sedatus* p. p. of *sedo* = *to allay*).—Refers to the sedative properties of this valeryl phenetidin—$C_6H_4.(O.C_2H_5).NH.CO.CH_2.CH_2$-$(CH_3)_2$. This same title was a former synonym for antipyrine.

Dulcin (*dulcis* = *sweet*) or Sucrol (*sucre* = Sugar).—Para-phenetolcarbamid, $CO(NH_2).NH.C_6H_4.O.C_2H_5$.

PYRAZOLON DERIVATIVES.

Antipyrine (*anti* (αντι) = *against*, *puretos* (πυρετος) = *fever*).—A phenyldimethyl pyrazolon, $C_6H_5.N : (CO.CH)(N : CH_3)C.CH_3$.

Among the synonyms we find:

Anodynin.—*An* (αν) = *negative*, *odyne* (οδυνη) = *a pain*.

Analgesine.—*An* (αν) = *without*, *algos* (αλγος) = *pain*.

Sedatin.—See above.

Parodyn.—*Parodos* (παροδος) = an arrival?

Tolypyrine.—So called from the presence of the tolyl group $(C_6H_4CH_3)$ in place of the phenyl (C_6H_5) of antipyrine. A tolyl-dimethyl pyrazolon, $C_6H_4.CH_3.N : (CO.CH)(N : CH_3.C.CH_3)$.

The following comprises a list of various combinations of antipyrine (also tolypyrine) in which the ending "*pyrine*" is attached to a prefix representing the combining body, thus:

Sali-*pyrine* = Antipyrine salicylate.

Pheno-*pyrine* = A compound of phenol and antipyrine.

Pyrogallo-*pyrine* = A compound of pyrogallol and antipyrine.

Reso-*pyrine* = A compound of resorcin and antipyrine.

Ferro-*pyrine* = A compound of ferric chloride and antipyrine.

Coca-*pyrine* = A mixture of antipyrine and cocaine.

Naphto-*pyrine* = A compound of beta-naphtol and antipyrine.

Iodo-*pyrine* = An iodin derivative of antipyrine.

Mono-chloral-*antipyrine*, or Hypnal (*hypnos* (υπνος) = sleep).

Amido-*antipyrine*. Class I.

Acetyl-amido-*antipyrine*. Class I.

Tolysal = Toly-pyrine salicylate.

Tussol (*tussis* = a cough).—Antipyrine mandelate. Used in treatment of whooping-cough.

Pyramidon.—An arbitrary name for di-methyl-amido-phenyl-di-methyl-pyrazolon.

Salubral (*salubris* = *healthful*).—A bromated methyl antipyrine. Used as antiseptic.

QUINOLIN DERIVATIVES.

Under these derivatives we find both antiseptics and antipyretics. Owing to the complex nature of the various medicinal derivatives, the employment of chemical descriptive titles is entirely out of the question, hence class two is alone represented.

Class II.

Chinosol.—An oxy-quinolin-potassium-sulfonate. Probably compounded from *chino* (chinolin) and *sol* (sulfonate).

Diaphtherin (*diaphtheiro* (διαφθειρω) = *to completely destroy*).—The title refers to its bactericidal properties. Chemically diaphtherin is a compound of oxy-quinolin and phenol-sulfonate of oxy-quinolin.

Diaphtol or Quin-aseptol (a (α) = negative, *sepo* (σηπω) = to putrefy). A *quin*olin derivative of active antiseptic properties. The title "diaphtol" is probably of same origin as diaphtherin.

Kairin (*kairos* (καιρος = *an opportunity*). Oxy-quinoline-ethyl-hydride, $C_9H_{10}(C_2H_5).NO.HCl$.

Kairolin (*kairin* + *oleum* = *oil*).—Quinolin methyl, or ethyl hydride, an oily substance.

Thalline (*thallos* (θαλλος) = *a green twig*).—The title refers to the bright green color produced by oxidizing agents. Chemically, thalline is a tetra-hydro-quin-anisol.

Loretin.—Chemically, a meta-iodo-ortho-oxyquinolin-ana-sulfonic acid, named by its discoverer, Prof. Claus, in honor of his daughter "Laura."

Lorenit.—Chemically a para-iodo-ana-oxy-quinolin-ortho-sulfonate, an isomer of "loretin." This name was coined from loretin by reversing the last three letters, thus lore nit.

PHENOLS AND DERIVATIVES.

Class II.

Annidalin (probably *annus* = *year*, *dalos* (δαλος) = *shining light*).—A dithymol-tri-iodid.

Aristol (*aristos* (αριστος) = *the best*.—Di-thymol-di-iodid.

Aseptol (*a* (α) = *the negative*, *sepo* (σηπω) = *to putrefy*).—Ortho-sulfo-phenol—as synonym we have:

Sozolic acid, (*sozo* (σωζω) to preserve, *oleum* = *an oil*). This title refers to the preservative or antiseptic properties, and to its oleaginous character.

"Aseptolin." A solution supposed to contain phenol and pilocarpine.

Microcidin (*mikros* (μικρός) = *small, caedo* = *I kill*).—A sodium beta-napthol. The title refers to its bactericidal properties.

Asaprol (*a* (α) = *negative, sapros* (σαπρος) = *putrid*).—A beta-napthol-monosulfonate of calcium.

"Asparol."—A fluid extract of asparagus. There is no occasion to select a similar title like this for a fluid extract.

Traumatal (*trauma* (τραυμα) = *a wound*). — Ortho-iodo-cresol, $C_6H_4(OI).(CH_3)$, an antiseptic for wounds.

Losophen (*louo* (λουω) = *to wash, pheno* (φενω) = *to destroy*).—The title probably refers to its antiseptic properties as a wash. Chemically a tri-iodo-meta-cresol, $C_6HI_3.(OH).(CH_3)$.

Europhen (*euros* (ευρος) = *decay, pheno* (φενω) = *to destroy*). Iso-butyl-ortho-cresol-iodide, $C_4H_9.(OCH_3).C_6H_3.C_6H_2.C_4H_9\ CH_3\ .OI$.

Eosote.—Creosote valerate. The first two letters ("cr") of the word creosote have been dropped and the remaining letters made to form the word.

Class I.

These titles are compounded from syllables of their several constituents.

Brom | *ol.*—Tri-bromo-phenol, $C_6H_2Br_3.OH$.

Chin | *aphtol.*—Beta-naphthol-alpha-mono-sulfonate of quinine (chinin).

Lact | *ol.*—Lactic ester of beta-naphthol.

Guaia | *quin.*—Quinine-guaiacol-bisulfonate.

DI- AND TRI-OXY-BENZENE DERIVATIVES.

Class II.

Resorcinol (*resin* + *orcin* = *-ol*).—Antiseptic.

Eugallol (*euo* (ευω) = *to roast*, that is, heated to a high temperature, *gallol* = *gallic acid*).—Chemically pyrogallol monacetate.

Lenigallol (*lenis* = *soft or flaxy, gallol* = *gallic acid*).—A pyrogallol tri-acetate.

Tannon.—An arbitrary title for hexa-methylene-tannin.

Tannigen and *Tannosal* are specially coined titles for tannin combinations, the former being a di-acetyl-tannin, while the latter is a compound of tannin and creosote.

Class I.

These titles are compounded from syllables of their constituents.

Gall | *al.*—Basic aluminium gallate.

Gall | *anol.*—Gallic acid anilid, $C_6H_5.NH.CO.C_6H_2(OH)_3$.

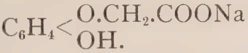
Gallo | *bromol.*—Di-bromo-gallic acid, $C_6Br_2(OH)_8.COOH$.

Gall | *acetophenone.*—Tri-oxy-aceto-phenone, $CH_3.CO.C_6H_2(OH)_3$.

Sali | *gallol.*—Pyrogallol-di-salicylate.

Acet | *amin* | *ol.* — Para-acet-amido-benzoyl-eugenol, $C_6H_3(OCH_3)$.(C_3H_5).O.CO.C_6H_4.NH.CO.CH_3.

Guai | *acet* | *in.*—Pyrocatechin-mono-acetate of sodium, a derivative of guaiacol,



$$C_6H_4<\begin{matrix}O.CH_2.COONa\\OH.\end{matrix}$$

Salol (*sal* (*salicyl*) + *ol*).—Phenyl salicylate.

Cre | *salols.*—Cresol salicylate, $C_6H_4(OH)$.COO.C_6H_4.CH_3.

BISMUTH COMBINATIONS.

The majority of these are used as antiseptic dusting powders.

Class I.

Bismu | *tan.*—A combination of *bismu*th, resorcin and *tan*nin.

Bism | *al.*—The bismuth salt of methylene di-gallic acid, the latter being a condensation product of formaldehyde and gallic acid. The ending "al" probably refers to the aldehyde character of the salt.

Iodo-gallicin.—Bismuth-oxy-iodo-methyl-gallol.

Class II.

Airol (Probably from *aireo* (αιρεω) = *to conquer*).—Oxy-iodogallate of bismuth $C_6H_2(OH)_3$.COOBi.OH.I.

Dermatol (*derma* (δερμα) = skin).—Basic subgallate of bismuth, C_6H_2-$(OH)_3$.COOBi$(OH)_2$.

Eudoxin (*eudoxia* (ευδοξια) = *renowned*).—Tetra-iodo-phenol-phthalein-bismuth.

Maneasol. An arbitrary name for bismuth borophenate.

Helcosol (*elkos* (ελκος) = *an ulcer*).—An antiseptic dusting powder used for healing ulcers, etc., chemically a basic bismuth-pyrogallate, $(C_6H_3$-$(OH)_2O)_2$.Bi.OH.

Thioform (*theion* (ϑειον) = *sulfur*, *forma* = *form*(of)).—A basic bismuth salt of di-thio-salicylic acid.

Intestin (*intestinus* = *within or internal*).—Refers to the employment of this remedy as an intestinal antiseptic.

Xeroform (*xeros* (ξηρος) = *dry*, *forma* = *form*).—A tri-bromo-carbolate of bismuth, $Bi_2O_3(C_6H_2.Br_3.OH)$. An antiseptic dusting powder.

MISCELLANEOUS.

Class I.

Acetyl-ethyl-phenyl-hydrazine.—This excellent antipyretic has not met with much success, one disadvantage being its long chemical title. The same can also be said of the list below, among which are,

Aceto-amido-antipyrine.—An antipyretic.

Acet-ortho-toluid, $C_6H_4(CH_3)$.NH.$COCH_3$.—Antipyretic.

Aluminum-potassium-para-phenol-sulfonate, $Al_2K_2(C_6H_4(OH)SO_3)_8$.—Antiseptic astringent.

Meta-amido-phenyl-para-methoxy-quinolin.—An antipyretic.

Ingenious euphonic combination titles, made by combining different syllables of the compounds entering into the composition of the remedy are to be found in such as

Sal | *umin.*—Aluminum salicylate.

Tann | *albin.*—Tannin and albumin combination.

Sali | *formin.*—Formin salicylate.

Sal | *acetol.*—Salicyl acetol.

Sali | *thymol.*—Thymol ester of salicylic acid.

Sali | *pyrine*, *Toly* | *pyrine*, *Tanno* | form, etc.

Class II.

Agathin (*Agathos* (αγαϑος) = *good*). — Meaning probably "a good thing" (?). Salicylic-alpha-methyl-phenyl-hydrazone, $C_6H_5.N(CH_3).N:-CH.C_6H_4(OH)$. Used as anti-rheumatic.

Antithermine (*anti* (αντι) = *against*, *therma* (θερμη) = *febrile heat*).—An antipyretic. Chemically phenyl-hydrazine-levulinic acid.

Eucain A. (alpha).—An arbitrary name for benzoyl-methyl-tetra-methyl-gamma-oxy-piperidin-carboxylic-methyl-ester. A local anæsthetic. The advantage of a short title is very evident in this case.

Eucain B. (beta).—The hydrochloride of benzoyl-vinyl-di-aceton-alkamin. A local anæsthetic.

Holocain. An arbitrary name for para-di-ethoxy-ethenyl-di-phenyl-amidin. A local anæsthetic.

Symphoral (sym (n) (συν) = *together*, *phora* (φορα) = *carrying).*—Sodium sulfocaffeate, a diuretic.

Pyratin (puretos (πυρετος) = *a fever).*—Para-ethoxy-phenyl-succinimid, $(CH_2CO)_2:N.C_6H_4.OC_2H_5$. An antipyretic. This should not be confused with a preparation called "Pyretine," which consists of a mixture of acetanilid, caffeine, sodium bicarbonate, and calcium carbonate.

Nosophen (nosos (νοσος) = *disease*, *pheno* (φενω) = *to kill).*—A tetra-iodo-phenol-phthalein. Antiseptic.

Apyonin (a (α) = *negative*, *puon* (πυον) = *pus).*—An antiseptic yellow dye.

Pyoktanin, blue (a methyl violet), yellow (an auramine).—From *puon* (πυον) = *pus*, *kteino* (κτεινω) = *to kill.*

Uropherin (ouron (ουρον) = *urine*, *phero* (φερω) = *to carry*).—Theo-bromine-lithium-salicylate. A diuretic.

Organic Silver Preparations.

Argent | *amin.*—An ethylene-diamine-silver-phosphate. Compounded from "argent" (silver) and "amin," since it belongs to the class of amines.

Argen | *tol.*—A silver quinaseptolate. Compounded from "argen" or "argent" (silver), the ending "tol" being probably taken from septol.

Argon | in.—Argentum casein. The word is made up of the first and last syllables of the two words argentum and casein.

Larg | in.—An albumin compound of silver. Evidently the letter "L" has been prefixed to the syllable arg (argentum), while the termination "in" is taken from albumin.

Actol.—A coined title adopted from its constituents, namely, silver lactate.

Prot | argol.—A protein silver compound. The title is made up from syllables of its two constituents, namely, protein and silver (argentum).

Hydrogol and Itrol are arbitrary names selected for a solution of colloidal silver and a silver citrate.

From the examples thus far used, it will be observed that chemical nomenclature has been retained in most cases where practicable; however, the majority of these synthetic products possess such long chemical titles that their employment is entirely out of the question. No matter what valuable medicinal properties a remedy may possess, its success or failure depends largely on its title. For example, the fate of Loretin can be readily imagined were it introduced under its chemical title of meta-iodo-ortho-quinolin-ana-sulfonic-acid; the same could be said of Eucaine "A," whose chemical name contains 70 letters; and so on with a host of others. The medical fraternity and commercial world have no use for medicinal products possessing long complicated chemical titles, hence the necessity of selecting a convenient euphonic name which is readily retained in the memory.

If all these medicinal products belonged to the simpler organic groups, for example, the aldehydes, ketones, phenols, etc., it would be a comparatively easy matter to adopt a uniform prefix to be attached to the commercial title indicating the organic group to which it belongs. Of late years, however, these bodies have taken on a very complex character; indeed, so much so, that such a plan would be useless. Prefixes or suffixes indicating the medicinal properties of the body I consider impracticable, as the titles are sufficiently distinctive at present. Any attempt at renaming the list already introduced would be discouraged by the patentees, and result in confusion.

What is desirable at this stage is not a revision of the nomenclature of the true synthetics, but steps which will discourage the use of like sounding titles for proprietary concoctions, which not only give rise to danger of confusion, but are very misleading.

The following examples will illustrate the points in view:

We have the chemical compound *acetal*, which is used as a hypnotic; under the titles of *acetal* and *acetol*, there are two proprietary toothache remedies.

Antisepsine is a para-bromo-acetanilid, an antipyretic; under the like sounding title of *antiseptin* we have one an antiseptic mixture, and another which is a wood preserver; under the title of *antiseptol*, we have a compound antiseptic powder, and *antiseptikon*, a dental wash. *Chloral* is the well-known tri-chlor-aldehyde, while *chlorol* is probably a mixture of Na_2SO_3, NaCl, HCl, $CuSO_4$ dissolved in water, used as a disinfectant. *Papine* is a vegetable digestive ferment, while *papin* is probably a glycerole containing catechu, quinine and dextrin.

There are many others similar to the above; these will, however, suffice.

For the following fluid extracts we have titles some of which properly belong to neutral active principles, as for example:

Pertussin—Fld. Ext. Thyme.
Sambucin—Fld. Ext. Sambucus Niger.
Vicosin—Fld. Ext. Saponaria.
Senecine—Fld. Ext. Senecio Jacobosa.
Spinol—Fld. Ext. Spinach.
Apon—Fld. Ext. Capsicum.

As an illustration of the ingenuity exercised by these proprietaries for high-sounding titles, the following examples are cited:

Anal—A pile remedy.
Anusol—A pile remedy.
Gastromyxin—A veterinary remedy.
Gonorol and Gonopepsin are gonorrhœa preparations.
Hegoria—A remedy for bed-wetting.
Laxol—A prepared castor oil.
Oxin—An extract of beef.
Rub-it-in—A liniment.
Nervosine—A nervine.

The following formidable titles represent harmless ointment vehicles:

Adipatum,
Agnolin,
Alapurin,
Anaspaline,
Byrolin,
Epidermin,
Fossilin,
Gelanthum,
Gelatol,
Glycogelaine,
Glycoline,
Glymol,
Lucilline,
Mollin,
Mollosin,
Paral,
Oesypus,
Savonal,
Tarralin.

The reading of the paper and the blackboard illustrations were greeted with hearty applause.

MR. REMINGTON: I think we should not pass this paper without expressing our appreciation of the efforts of Prof. Coblentz. He has given us an idea of how many of these words were derived. I think he was only sure of "Laura." (Laughter.) I also beg to state that the Professor's blackboard illustrations and his use of chalk were quite admirable. If he regales his students so admirably, they must make good progress.

Upon motion, the paper was ordered received and referred to the Publication Committee.

Mr. Alpers read a paper on "Shorter Hours for the Pharmacist."

SHORTER HOURS.

BY WILLIAM C. ALPERS, NEW YORK.

Many druggists, especially the older ones, have become accustomed to the working day of sixteen hours to such an extent that they do not consider the agitation for shorter hours as anything worthy of their notice. They pass it over as the impractical notion of some idealist or useless prattle of a youthful reformer. The yoke that they have borne all their lives does not press them any more, and has become a necessary accessory to their vocation, like a pestle or graduate. Or they do not see the justice of freeing the coming graduate of a burden that has been theirs almost from childhood. "We had to work so long and so hard, why should not our clerks?"

What would these pharmacists think of any other set of men that were subjected to similar service? Commence at the lowest ranks and put such possibilities before you. If the convening council of any city would ask their street-sweepers to work sixteen hours and rest eight, a howl of indignation, in which every druggist would join, would rise, and the next election relegate the men of such outrageous opinions to political oblivion. If a merchant would ask his typewriter to work sixteen hours a day, and seven days a week, he would never have his letters written, for self-respect would compel every employee to leave at once. Or let us suppose that some board of education would ask the teachers to work from eight in the morning to eleven at night, with only a short intermission for lunch and dinner! We may be sure that public indignation would sweep such men out of office. There is no trade, no profession, no occupation of any kind, from the lowest to the highest, that could for a moment entertain and enforce such measures, and yet, the pharmacists submit to it. From their beds they step into their shops, and from the shops back into their beds. There is no intermission in their onerous duties, no occasion for recreation, no opportunity for further instruction or enlightenment.

A man might forsake his desire for recreation; he may persuade himself that his tedious work behind the counter is his recreation; nobody can argue with him on this point. But the impossibility of further instruction, after he once entered the treadmill, will sooner or later tell on him; in fact it is telling now, and has been telling for years on our profession individually, as well as collectively.

The education of a druggist, after he has once entered the shop either as registered clerk or as proprietor, terminates at that moment; what he adds to it later is merely incidental and acquired by force of circumstances beyond his control. The ideal that he imbued in his college, and his youthful enthusiasm or scientific ambition, soon fade and die under the load of duties and cares that await him. Seeing and hearing every one around him sneering at the scientific pursuit of pharmacy as impractical talk of professors who do not know the drudgery of the daily routine, he soon becomes indifferent to the advances of chemistry, medicine, and kindred science, and each new chemical invention is weighed and valued only by the amount of possible profit that he can get out of it. The doors of our public libraries are closed for him, for he has no time to visit them; the halls of museums of art or science do not exist for him, and he will forever lack that refreshing inspiration that the stay in such places imparts to the refined and educated. Lectures and exhibits of scientists are not frequented by him, and the works of our great writers are hardly known to him by name. There is no time for all this. Work, work, work, occupies the mind from morning to night, and if there should be a spare minute, it is due to the family, the wife and children, who generally suffer more under these mis-conditions than the pharmacist will admit or believe.

His social intercourse with his neighbors is extremely limited; he has neither the time to visit others, nor receive their visits. Places of amusement do not exist for him, and excursions and picnics are not on his programme. The gatherings of his fellow-citizens for political purposes, be it for the advancement of public affairs in his native town or for national matters, are not attended by him, and but rarely is a retail pharmacist called to an elective office in the service of his country. Even the gatherings of the various state or national pharmaceutical associations are frequented by but very few, and among these few, the majority are only bent on the pleasures that are offered, looking for a short change of surroundings and relief from their drudgery. At the sessions the attendance is therefore small, and but little attention is paid to scientific papers and lectures, except by those who are more intimately interested through their position as teachers; and the pleasure of a trolley ride, or some exhibition of sport, has greater attraction to most of them than a discussion on scientific subjects. Not that the indulgence in such pleasures should be denied them. Far from it! But the fact that the main object of some associations seems to consist in hardly anything else but childish sports, shows convincingly how little recreation the pharmacists generally enjoy, judging such enjoyments—which any other set of men can have every day—to be the proper way of spending the annual pharmaceutical conventions.

No wonder, then, that the average pharmacist is decried as a narrow-minded crank; how can it be different? To him his education was stopped years ago, and art and science have remained to him what they were at the time of his earlier years, leaving him unconscious of their enormous and never-resting strides in a forward direction. To him the four walls of his shop are his world, and a broader view is denied him. He therefore looks upon the long confining hours as a necessary evil, and is unable to formulate any plan for relief or remedy out of the trouble. In addition to this, the financial difficulties under which he often suffers prevent him from even attempting a radical reform, for fear of loss in addition to those that he has suffered during the last decade.

It is hardly necessary to dwell upon the deplorable fact that among our druggists there are but very few, if any, who devote time or thought to original investigation and research. The complaint is often heard that, although the pharmaceutical journals are bought, they are not read by the rank and file, because there is no time. How then can there be time to study, to investigate, to write? And if one or the other, driven by an uncontrollable ambition to excel, and unwilling to lapse into total degeneration, remains true to his ideals, it can only be done by stealing the hours for such work from his sleep, and at the expense of his commercial success.

Some will say that this picture is overdrawn; that the conditions are not so bad as is here described. But if there are exceptions, they are owing to more favorable circumstances than generally prevail. Older, more fortunate members of our profession, who have acquired a competency, and are able to retire from business and leave the arduous work to younger assistants, will tell us of the years of uninterrupted labor from morning to night through which they lived. Indeed, we may well say that in our calling only men of giant physical constitution and unusually strong mental powers can hope to pass the last years of their lives in that *otium cum dignitate* which should be the reward for every faithful and earnest worker.

If such then is the actual state of affairs in our profession, why do we endure it?

The writer has argued the subject with pharmacists from every part of the United States. There has been but one sentiment—it is the one thing on which all agree. The intolerable burden, the moral injustice of long hours, are recognized by all; every one has complained of it, has suffered by it, has cursed it. Its existence is not denied. Why then not abolish it? What are the insurmountable obstacles that confront us? Why does it seem next to impossible to introduce reforms?

The answer to these questions is not hard to find.

As in so many propositions and enterprises tending to alleviate the difficulties surrounding our vocation, the pharmacists are prevented from acting in unison by their total lack of organization, by their timidity, if not cowardice, and the absence of a courageous and able leader in whom they have confidence. Their seclusion from the outside world, and long confinement in their little shops, makes them unfit to act in accord; instead of uniting enthusiastically with their neighbors for mutual protection, they generally see in every brother pharmacist an enemy, against whose visionary injuries and attacks they must defend themselves.

Spasmodic efforts to abolish the slavery of long hours have from time to time been made, but always proved unsuccessful because they lacked general support.

The majority of proprietors do not worry about this question, and are satisfied with, or at least indifferent to, this undignified state of affairs. The agitation must therefore come from those who suffer most by it, the clerks, who, as a rule, are still less organized than their employers. But even where they are united they probably never have met with the authorized representatives of their employers; and here may be pointed out the remarkable fact that in our profession, that boasts itself of being composed of educated men, there is absolutely no connection and fraternization between these two classes. How many clerks are members of State Associations, or of the National Association? If they are asked to join, they naturally reply: "I cannot go: why shall I join?" And yet, from these ranks the later members of the Association must be drawn, and here lies one of the most powerful reasons why it is so hard to increase the membership of many associations.

In two states, New York and Massachusetts, the assistants organized last year for energetic action, and tried to find relief from their too onerous duties by legislation.

Unable to limit the length of time during which a pharmacy should be kept open, they resorted to the restriction of the working hours of the assistants. There seems to be a certain justice in this. The proprietor is at liberty to come and go, to keep open or closed; but the clerk, who sometimes has a family to support on a comparatively small salary, and knows the enormous competition under which he suffers, must in most cases willingly submit to many hardships. If, therefore, legislative protection is deemed advisable, it should be given the assistants, and the proprietor kept responsible for every violation of the law by its strict enforcement.

In the City of New York, Mr. C. F. Doehrr, a pharmacist on Ninth Avenue, worked with untiring energy in this laudable cause, sacrificing time and money, and, like many other reformers in pharmaceutical matters, earning the severe and sometimes unjust censure of many of those in whose interest he labored.

In Massachusetts, the clerks under the leadership of Mr. W. T. Thomson, a former drug clerk, now a student in law, introduced a bill, assisted by their counsel, M. W. Stoover.

As this agitation is bound to spread, sooner or later, over the whole United States, a closer consideration and comparison of the two proposed laws may not be without interest, and they are therefore here reproduced.

NEW YORK LAW.

Section 1. This act shall apply to all The City of New York.

P. 2. No pharmacist, drug clerk, or other employee engaged in the preparation or compounding of prescriptions or medicinal preparations in any pharmacy or drug store, shall be required or permitted by the proprietor to work more than ten hours on any week day other than Saturday, and not more than twelve hours on Saturdays, and not more than six hours on Sundays and legal holidays. Nothing in this section shall prohibit the working of one hour over-time on any day except Sunday for the purpose of making a shorter workday, provided, however, that the aggregate number of hours per week does not exceed sixty-six.

P. 3. No proprietor of a pharmacy or drug store shall require or permit any one of his clerks to sleep in such pharmacy or drug store, or in any store room or laboratory connected therewith. Nothing in this section shall prohibit the sleeping in any other room adjoining such pharmacy or drug store, provided, however, that such room is properly ventilated and complies in all other respects with the sanitary regulations of the board of health of The City of New York.

P. 4. It shall be the duty of the board of health to adopt rules and ordinances for the enforcement of this act, and also to adopt such additional rules and ordinances to prevent accidents in the preparation and compounding of prescriptions and medicinal preparations as the public security may require.

P. 5. This act shall take place immediately.

MASSACHUSETTS LAW.

Section 1. No person or persons shall be employed in laboring in any retail, wholesale, or manufacturing pharmacy doing business in this Commonwealth, for more than sixty hours in any one week, or for more than ten hours in each twenty-four hours.

Section 2. Whoever, either for himself or as an agent for another, employs or has in his employment any person or persons in violation of the preceding section, and whoever permits any person or persons to be so employed as aforesaid, shall be punished by a fine of not less than fifty nor more than one hundred dollars for each offence. Said penalty shall extend to corporations.

Section 3. This act shall take effect upon its passage.

A comparison of the two acts will show that the Massachusetts law is more radical than the New York law, extending to every employé, registered or otherwise, and limiting the working hours of a week to 60 against 66 in New York, and the hours of one day to 10 against 12 in New York. The New York law goes into more details about the distribution of the working hours, and thereby points out a way for a weekly half holiday.

Why the New York law should only apply to prescription clerks is hard to understand; the apprentices and juniors certainly deserve the same consideration. They are sometimes young men who, physically, are not perfectly developed, or who must still attend schools and colleges, and, therefore, need recreation more than their older brethren. Also the restriction of the New York law to the city of New York, does not seem to be warranted. If adopted, it would bring all good clerks of the State to New York, in order to profit by it, thereby creating an unduly strong competion, while druggists in the other parts of the State would find it difficult to hold their assistants, unless equal privileges are granted them. The Massachusetts law also includes wholesale and manufacturing druggists. This is a good extension, although, as a rule, the working hours in such business do not now exceed ten.

In addition to the restriction of working hours, the New York law also prohibits the sleeping of clerks in unhealthy surroundings. They may sleep behind the store, but a separate, well-ventilated room must be provided. In country districts, where floor-space is not so valuable as in New York city, the necessity of this section can hardly be understood ; in large cities, however, it is not unusual to assign a place behind, or even under the counter, to the night clerk, and such undignified conditions should certainly be abolished.

A good pharmacist, young or old, should gradually accumulate a library ; he should have a place and the time to read, study and write, and take pride in collecting specimens of such a nature as his inclination will direct, either botanical, chemical, or mineralogical. All this cannot be done if his home consists of a box under the counter, and it is not seldom owing to such unworthy conditions that all ambition and ability for study and research is killed in the bud, and all interest in pharmaceutical matters, including State and National associations, extinguished forever.

If it is true, as the opponents of the law claim, that there are no pharmacies any more where such requirements are made, then this clause can do no harm, and no reason exists why the whole law should be condemned on its account.

In the enforcement of the law, the two acts differ widely. The New York law mentions no penalty and leaves the enforcement to the Board of Health, giving this Board power to make additional rules and ordinances. This clause might possibly act as a boomerang, and cause much mischief, in case the Board of Health should be inclined to "fry fat" out of the druggists in the interest of some individual.

The Massachusetts law provides a penalty of from fifty to one hundred dollars for each offense. It would be still better if the person to bring the suit, and the court where to bring it, had been mentioned, so that no question as to the proper authority or jurisdiction could be raised.

Why did the two laws fail, and who opposed them? The writer corresponded with a number of pharmacists in Massachusetts, and wishes to tender his thanks for the willingness and readiness of the replies, especially to Mr. W. W. Bartlett, of Boston. From this correspondence it appears that all desire shorter hours, but opposed the proposed law on account of its too radical features, claiming that the limit of ten hours a day is too sudden and unwarranted a change. The Massachusetts State Pharmaceutical Association and the Massachusetts Druggists' Alliance were particularly active in the defeat of the bill.

In New York the opposition came principally from two local societies, who worked with great energy for its defeat, which they finally accomplished. As stated before, there is a very objectionable clause in the New York draft that should have been abandoned ; but the opposition was not so much against this clause as against the principle of shorter hours in general, and claims were made that the clerks did not need nor want shorter hours. The fact that a number of trade unions had indorsed the movement, and lent it moral support, also aroused the ire of many pharmacists, who claimed that thereby they were put on the same level with bottle-washers, hod-carriers, and other mechanics.

This argument is hard to understand, especially if we consider that also persons of the highest education, as lawyers, clergymen and editors, as well as the public in general, were in favor of the law. Why a movement should be condemned because people of all grades of education, in all positions of life, support it, will never appear plausible in this country of republican institutions; it rather shows how popular the agitation became from its very beginning, and that its principle is good, and must finally prevail.

A careful and unbiased study of the efforts and results accomplished by our trade unions would be of infinite benefit to the pharmacists; and far from sneering at them as unworthy allies, they would learn that these men, although inferior in knowledge and education, succeed far better in their sphere of life, because they cheerfully sink their individual claims and grievances in the general welfare. Their example shows that "in union there is strength," a maxim that the pharmacists will not learn in spite of all their tribulations and difficulties.

The fact that the first organized efforts in reforming this abuse have failed, is no reason why later efforts should not succeed. Errors were certainly made by the promoters, and as is often the case in reformatory moves, they sometimes shot beyond the mark. By no means should there be any personal feeling, and the agitation should be carried on without enmity. As the existence of the evil is not denied, there seems to be no need of mutual vituperation and invective. There can be no doubt that these first efforts, and the arguments for and against the bills, have brought out many points that before were overlooked. The writer believes that a restriction to 66 hours during the week would be a sufficient reduction at the present time, but does not think that the working hours of any one day should be mentioned. Such an arrangement would leave the subdivision to each employer, who is then enabled to consult his own welfare, and adapt the new system to his particular situation and demands. The introduction of a new authority, as the Board of Health, appears unnecessary to the writer. The democratic principle of home rule is also applicable to pharmacy, and if any legislation and fining is to be done, the execution of the law should rest with the Board of Pharmacy. If the pharmaceutical profession is not able to govern itself it may as well disband. It was stated by some advocates of the New York law that the present Board of Pharmacy in New York was opposed to the law, and would therefore not execute it. Such a view is entirely untenable. The Board of Pharmacy will have no choice if the law is once enacted, and will run no chance of indictment for malfeasance of office. By changing their law in this respect a great deal of opposition would at once be silenced, and its success be greatly enhanced. The definite statement of the fine for violation should also be made, as was said before.

It is the writer's belief that the demand for shorter hours will soon be the battle-cry of every self-respecting pharmacist, and the agitation in its favor will sweep this country from one end to the other. Far-seeing men have already recognized the necessity of a reform on these lines, and it is a positive fact that the few who have boldly instituted this innovation in their own business, report, without exception, the most favorable results. There has been no dropping off of business, no growling of displeased customers, no loss of trade. Those of us who look upon our profession as a mere trade, and believe that dealing in patents, toilet articles, cigars, drinks of all description, stationery and other commodities, is the true occupation of a pharmacist, may have little interest in this movement; they will squeeze their clerks as best they can, and call every demand, after 9 p. m., for a cigarette, a piece of chewing-gum or a postage stamp, a case of emergency for which they must be prepared. But those of us who hope to rescue the profession of pharmacy from the intolerable bonds of low mercantilism, and work for a brighter future, will gladly indorse this new departure. To them a pharmacist must be more than a pliant salesman with a silver tongue; they require men of education and ability, who with earnestness and devotion will continue to study and learn, and therefore need leisure and recreation to cheerfully keep astride with all pharmaceutical sciences. To continue under present conditions means the killing of all higher ambition, the destruction of all enthusiasm for a noble profession; it means the death of all research and investigation by pharmacists, and the raising of a generation of pharmacists who are enthralled in dull slavery, and must look upon their occupation as the smallest and meanest and most abominable business exercised in unrelenting drudgery.

There is no nobler occupation than that of the pharmacist, whether he prefers the commercial or the professional side. It comprises within its scope so many branches of knowledge, so much science, and requires so much commercial ability, that every one of its disciples should be proud of it, and ready to defend it against all enemies; but to do so it should also grant them a dignified and respected position, worthy of men of refinement and education.

An animated discussion on this subject then followed, in which Messrs. Huested, Bartley, Werner, Noll, Freericks, Hynson, Gregorius and Remington took part.

Upon motion, the paper was received and referred to the Committee on Publication.

In the absence of Mr. Mason, of Detroit, Mr. Helfman read the following paper prepared by that gentleman:

IS HE A COMPETENT PHARMACIST WHO PASSES THE STATE BOARD EXAMINATION AFTER FAILING THREE TIMES?

BY HARRY B. MASON.

In a paper read before the American Pharmaceutical Association at Minnetonka last year, Mr. Henry M. Whitney incidentally stated that of the 110 applicants who had passed during the last year the examination of the Massachusetts Board of Pharmacy, eighteen had passed on their first examination, ten on their second, twenty-eight on their third, twenty-two on their fourth, twelve on their fifth, and so on up until one man had passed on his eighteenth examination. It may seem rash and irresponsible to say that nearly all of those who passed after failing three times, at the most, were incompetent pharmacists—but I firmly believe they were. If an applicant has had proper experience, and has followed, in college or out, a systematic course of study calculated to render him competent, he will surely pass a state board examination that is just and determining on second trial, or at the very farthest, on third trial. The man who gets through on his eighth or eighteenth trial is either he who has finally found an examination that fitted him, one that demanded of him such peculiar bits of knowledge as he had; or he who shrewdly learns the ways of the examination and "crams" to meet them. If this be not so, if it be declared that such men are competent who pass after so many failures, what then is the inference? Why, that a competent man, instead of passing the first or second time, as he ought, has to keep at it until he is lucky enough to get through—which proves something radically wrong with the examination. So it is either the one thing or the other—either an incompetent man is honored, or a competent one abused.

Let us see in detail if this reasoning is fallacious. First, what determines competency anyway? Trained pharmaceutical faculties. Ability to think pharmaceutically—if I may so express it. To make this possible, knowledge must be absorbed by, and form an integral part of the personality, so that it becomes a part of oneself instead of remaining extraneous and therefore valueless. That is to say, between knowledge and personality there must be chemical union instead of physical contact. Such a transmutation of knowledge (and experience) can only result when it has been received systematically—received in a manner calculated to show the relation of similar parts, and the bond of unity that runs through and connects all. Knowledge heterogeneously gathered will not usually be retained long, for it is extraneous to the reasoning faculties; but even if retained, it is not in a usable form. The mind which holds it is in the condition of a box crammed full of all sorts of scrap-book clippings. The particular one needed can scarcely ever be found, but when found is generally useless because incomplete, and because of the absence of related parts. The scraps are valueless until they are hauled over, sorted, like put to like, and some system and order reached so far as possible. And even then, they would represent incompleteness, for there would be huge crevices between many of them that must be filled before anything like a successful whole could be formed. But while these inanimate scraps can first be gathered chaotically and afterward systematized and given value, knowledge thus gathered by the mind is subject to no such saving process. It must go in right in the first place, for as it goes in so it stays.

If this reasoning be correct, a pharmacist, to be really competent as such, must have followed a more or less systematic course of study, starting with the elements and building up. He must have constructed a treatise of pharmaceutical knowledge all his own, peculiarly his own, and be such master of it, as an integral part of himself, that a fact here and a fact there may be welded together by his reasoning, and applied to purpose. Having done this, he should pass an examination the first time. There may be, however, one or two chapters of his treatise incomplete or missing, one or two flaws in his creation, and these may, more or less justly, cause his defeat. But these would certainly be remedied by the time he took his second examination. If still he fail, and still again upon the third trial, then the examination is a perversion. It requires of him something not material to his competency. It demands of him odds and ends of memorizable facts, which, through lack of use, he has forgotten; or perhaps it sacrifices the sense of proportion in laying undue stress upon some weak point; or it is guilty of some other kind of injustice.

But suppose the competent pharmacist does pass upon his first or second trial. What now is the inference? That those who pass in later trials are incompetent—allowing for a few exceptions, of course. The only point that can be brought against this deduction is that such men are not competent on their early trials, but become so later. Now this is not reasonable in many cases. As I have tried to show in detail, there is, in the main, only one right road to preparation. The man who does not travel this can enter grace by no other way. His only remedy is to go back and get on the right road. How many do this? Very, very few, as I know from a considerable correspondence and acquaintance with applicants. In nine cases out of ten the applicant will travel the road he began on, until it brings him somewhere. If he began as a memorizer of isolated facts, so he continues. If he does not pass his first, or even his second examination, he pays closer attention to the character of the examination and bends all his efforts to preparing especially for it. He lets preparation for the practice of pharmacy go. The examination is his game: He confers with his friends who have been examined, and reaps the benefit of their failures. He memorizes the species of facts that the examination deals in. He smells and tastes of the crude drugs that the examination usually comprises. If he fails now, he is not daunted. He lays to his task with greater zeal. He crams and tastes and smells with renewed vigor, until finally his path leads him to the mossy bank of success after perhaps the fifth, perhaps the fifteenth, examination. Then he proceeds to forget what he has memorized at such a cost of scheming effort. Is such a man fit for the practice of pharmacy? Is the public ever to estimate pharmacy in its true importance if such men are sent forth by our boards as competent pharmacists?

Now, by way of explanation, I do not mean to say that every applicant is incompetent who passes an efficient board examination after having failed three times. But I do mean to say that the great majority are. There will be exceptions, of course. Occasionally an applicant will go back and begin a systematic course of study when he finds that it offers him his only chance of gaining competency. And a few, too, who began their preparation right, but lacked the perseverance and the energy to continue, will renew their activities after two or three failures have taught them the necessity of doing so. But these few cases are out of all proportion to the number given in Mr. Whitney's statistics. For instance, of the 110 men that passed his board last year, only eighteen passed on their first trial; and only twenty-eight on their first and second trials. And after three trials, when certainly almost every competent man should have been passed, 50 per cent. of the whole yet remained to pass on later examinations.

It is a matter of some conjecture which supposition explains so many men passing after repeated failures—whether the competent men are abused, or the incompetent ones honored. But it is evident that neither perversion would exist if the examination were positively determinative of competency, for then a man competent would pass early on proving his competency, and a man incompetent would "always and eternally" fail on proving his incompetency. However, while there is a vast need for improvement in the examinations—and I am not speaking personally of the Massachusetts board, having used Mr. Whitney's paper only as a general text—it is asking too much of them to expect that they will inevitably "pluck" the scheming "crammer" who sets himself to learning their ways. Not only, then, should there be made the vital improvements in examinations that are recognized as so necessary, but no applicant should be allowed more than say, three examinations, as Dr. Kremers suggested last year in the discussion of Mr. Whitney's paper.

MR. WHITNEY: This question has been before our Board frequently, and has been discussed every year, to see if we could not eliminate some of the terrible pressure. I have in mind a man who has been in the drug business thirty-five years, and he could have registered just as well as not in 1885 if he had chosen to. That man has been before us fifteen times. We would do anything we could to aid him, but he does not know enough. We have had a great deal to contend with on this score.

MR. HUESTED: In our State of New York we would be glad if the law would give us the privilege of cutting off applicants after a certain number of examinations. Our pharmacy law gave the privilege of two examinations on one fee—a first examination, and, if the applicant failed to pass, a second one without additional fee. That was the case with the law in New York State as originally passed; but in passing some amendments that provision was not mentioned, so that it was taken out of the law. But the Board has continued that practice, so far as the first two examinations are concerned, giving a second trial; but for further examinations after that, we make them pay the same fee as for the original examination, and that has reduced the number of such examinations.

Dr. Reed: The writer's paper started out with the question, "Can a person be a competent pharmacist after three trials and failure?" and he comes to the conclusion that he would not be. That question can not be answered in that way. There is no limit of time. It is the business of Boards to make sure of a man's qualifications. It is immaterial whether the applicant has applied twenty times, or twice twenty times. It is the Board's business to find out his competency. No legislation, in my judgment, can properly put a limit to it; the matter rests with the Board. The members of the Boards of Pharmacy are not always themselves competent to examine. A great improvement is needed along that line, so that these Boards will provide the right kind of examinations. Then let the applicants come as often as they like. If incompetent, they will be refused a certificate; if competent, they will be granted certificates.

Dr. Whelpley: I agree with the last speaker, that we could not secure a law which would limit the number of times that a candidate could appear before the Board. There are many reasons why it would not be just. But I do believe that regulations could be made, probably, by the Boards themselves, to the effect that an applicant could not appear more than a certain number of times within a certain period, and in that way they would be discouraged in this multiplicity of attempts, and they would be given time for reflection.

Upon motion of Dr. Reed, the Section then adjourned until to-morrow (Saturday) morning at 10 o'oclock.

Third Session—Saturday Morning, September 3, 1898.

The Chairman called the Section to order a little after 10 o'clock.

On motion, the reading of the minutes was dispensed with.

The Chairman: The next matter that comes properly before us is the election of officers for the ensuing year. We have two nominees for chairman—Mr. Caswell A. Mayo, of New York, and Prof. Joseph Feil, of Cleveland. We have two nominees for secretary—Prof. Joseph Feil, of Cleveland, and Mr. Caswell A. Mayo, of New York. Further nominations are in order, according to our rules.

Dr. Bartley: I should like to place in nomination for Chairman Dr. A. B. Lyons, of Detroit.

The nomination was duly seconded.

Dr. Lyons: Mr. Chairman, I beg to withdraw my name from the list, for I do not see how it will be possible for me to do the work that is necessary.

The Chairman: That is a matter over which the Chair has no control. The nomination has been made and seconded. If there are no other nominations for chairman, I will ask for further nominations for secretary.

Mr. Remington: I nominate Prof. Lowe, of Philadelphia, for secretary. He would make a good officer, and there is lots of work in the place.

The nomination was duly seconded by Mr. Caspari.

On motion of Mr. Whelpley, the nominations were closed.

The Chair appointed as tellers upon the vote for Chairman Dr. Whelpley and Mr. Ryan.

Mr. Remington moved, in order to save time, that the person receiving the highest number of votes for each office should be declared elected. The motion was seconded and carried.

On motion, the Chair appointed Mr. Sheppard and Mr. Caspari to collect the votes for Secretary.

After the ballots for Chairman had been collected, Mr. Ryan announced that the total number was forty-two, of which Dr. Lyons had received 28, Mr. Mayo, 9, and Mr. Feil, 5; whereupon Dr. Lyons was declared duly elected by the Chair.

For Secretary, Mr. Sheppard announced that the total number of votes was 43, of which 29 were for Dr. Lowe, 10 for Mr. Mayo, and 4 for Mr. Feil. Dr. Lowe was declared elected Secretary accordingly.

The Chairman: The Chair wishes to present a brief report on "American Colleges and Attendance in such Colleges."

REPORT ON AMERICAN COLLEGES OF PHARMACY.

BY J. H. BEAL.

According to a list published in the Western Druggist, there are in the United States and Canada at the present time fifty-five institutions giving instruction in pharmaceutical subjects and conferring pharmaceutical degrees. Fourteen are classed as Departments of State Universities, twenty as Departments of Independent Universities, Literary Colleges, Agricultural Colleges and Normal Schools, and no less than seven as Departments of Medical Colleges. The remainder are mainly independent colleges of pharmacy, though the status of several is indefinite.

Several of those which are reported as department schools are only nominally such, since they have their own boards of trustees and conduct their business affairs independently, except at graduation day, when the degrees and diplomas are conferred by the head of the university or college of which they are rated as departments.

Three institutions are set down as schools for the colored race, though one of the three announces that students are admitted without regard to race.

During the past year correspondence was entered into with fifty-two of the above institutions concerning their attendance and other matters, and replies were received from all but the following:

South Dakota Normal College Department of Pharmacy.

Drake University Department of Pharmacy.
Medical College of Alabama Department of Pharmacy.
Kansas City College of Pharmacy.
Kansas Medical College Department of Pharmacy.
New Jersey College of Pharmacy.
National Normal University Department of Pharmacy.
North Carolina University Department of Pharmacy.
Southwestern School of Pharmacy.

Two or more letters of inquiry were sent to the Secretary of each institution without eliciting any reply, though assurance was given that their answers would not receive publication. Several schools of this list are reported to be non-existent.

The total attendance last year at the forty-three reporting colleges, was 3,830, a substantial increase over the preceding year. The largest number of students in attendance at one institution was 510; the smallest number, 7. Seventeen schools had less than fifty students each. Twenty-four schools report an increase, and seventeen a decrease in attendance over the preceding year. The largest increase at any school was 72; the largest decrease was 43. A number report no change in attendance. One institution reported that it did not have any students for the session of '96 and '97, and that its attendance for the session of '97 and '98 was unchanged. In general, where there was an increase in attendance, it was in the Junior class, while the falling off was commonly, but not invariably, in the Senior or graduating class.

As evidence of the fact that it pays colleges of pharmacy to advertise, it may be noted incidentally that an examination of the reports shows that the largest gains and the smallest falling off commonly occurred at the institutions which have occupied the largest amount of space in the advertising columns of the pharmaceutical press of the past few years.

As prosperous business times generally tend to decrease rather than to increase attendance at technical schools, and as the long-hoped-for revival of trade seems to be putting in its appearance, it is not unlikely that the ensuing year may show a diminished attendance at the colleges of pharmacy. This we think may be at least partially compensated for by the increased interest which is being taken in pharmaceutical education, and by greater efforts on the part of the colleges in bringing their advantages to the attention of prospective students.

The most encouraging feature derived from the study of the statistics of attendance, is the somewhat unexpected fact that increasing the length of the course of study does not cause a proportionate falling off in attendance. One school, which has largely lengthened its course, actually shows a small increase, another, which has almost doubled its curriculum within the past two or three years, shows no appreciable loss in numbers; while still another, which has increased its course from two years to three, suffered a loss of only two per cent., and as it will hereafter hold its students for three years instead of two, the prospects are that it will be rewarded for its courage by a very liberal gain.

Notwithstanding the already great number of pharmacy schools in the United States, we venture the opinion that the number is more likely to increase than to diminish, and this, whether we like it or not. Some pharmacists are very much in favor of stopping this increase of schools right off, and of eliminating some of the others, but omit to provide working formulas for the stopping and eliminating processes. These may console themselves with the reflection that the colleges do not admit pharmacists to practice, but the Boards of Pharmacy. If the laws are properly amended, and if the Boards do their duty, it should not matter whether the number of colleges be 55 or 550, since only competent men will obtain places on the register.

In any event, we do not see any great cause for alarm in the number of colleges when we reflect upon the present great disproportion between the annual number of graduates and the number of non-graduates who are annually registered as pharmacists. According to the best information obtainable from boards of pharmacy, graduates do not number more than about ten per cent. of the total of those who are annually registered in the United States, though the per cent. is undoubtedly higher in some States.

We may be somewhat prejudiced in the matter, but it is our opinion that pharmacists can better serve their day and generation by protesting against the immense number of non-graduates who are yearly licensed, rather than in trying to diminish the comparatively small number of graduates.

In one respect, however, the great increase of schools does menace the interest of the pharmacist, due to the fact that in certain States the law admits without examination the graduates of schools, making certain requirements before granting a diploma. It is so easy to make the requirement in the catalogue, and thus satisfy the law and the board, and so convenient to forget the requirement when graduation time comes around, or so easy to wink at incompetent evidence presented by the student, that a large loophole is left for evading the intent of the law. Reputable schools, of course, do not avail themselves of this dishonest opportunity, and this is the very fact which places them at a disadvantage compared with less scrupulous institutions.

As conditions formerly were, the admission of graduates may have been proper; as conditions now are, it is all wrong. The graduates of a good school have nothing to fear from a Board examination; the graduates of a poor school have much to fear from it.

We earnestly hope, therefore, that, in the interests of the public, of the pharmacist, and of higher pharmaceutical education, the legal recognition of diplomas in lieu of examination will be speedily erased from every statute-book in the United States.

It is to be regretted that the leading pharmaceutical schools and colleges are unable to find a common basis upon which to unite and form an organization, and determine what shall constitute a standard course in pharmacy, leading to a specified degree. The common interests, of the schools are so much in excess of their antagonistic interests that an association of this sort could not fail of beneficial results. While such an association could not determine who should or who should not maintain schools of pharmacy, it could at least determine, within reasonable limits, what should be the requirements for a school which should receive the countenance of the organization. I am sure that the American Pharmaceutical Association, and the State Boards and State Associations, would cordially indorse such a movement, and thus, by inference at least, set a conspicuous brand upon the institutions which would not consent to conduct their courses in accordance with the laws of decency.

At present the prospective matriculant at a college of pharmacy has no means of judging of the character of an institution, save what it says of itself in its announcements, and the more unscrupulous the institution, and the less deserving it is of patronage, the more likely it is to make use of deceptive statements. The colleges of dentistry and medicine have organizations of this sort, and have accomplished an enormous amount of good for themselves and for their professions. Why may not colleges of pharmacy do likewise?

Ths reading of the paper was received with great applause.

Upon motion of Mr. Main, duly seconded, the paper was received and ordered to be published.

Dr. Bartley; We can add to the higher pharmaceutical education all we please, but there is a practical limit to the requirements of a school teaching pharmacy, and that limit is the result, or income, that the student can get out of his knowledge after he is through there. In New York, the law is that a school teaching pharmacy can only grant the degree of Ph.D. after a three years' course and four years in a high school, and after 1900, four years in a high school and four years in a college, practically adding eight years' educational requirements for that degree. And yet that man may be set down by the action of the State Board of Pharmacy behind some counter at from twelve to fifteen dollars a week, with a man without any education except the ability to answer a few trivial questiens. Fifteen dollars a week will not pay the interest on a large sum of money invested in an eight-years' education. So we are limited in pharmaceutical education by what a man can earn. A man is not going to study eight years for fifteen dollars a week.

Mr. Hynson: I think we should get at the bottom truth of education, and this Association should take no step which does not look toward the establishment of schools of pharmacy in connection with our universities, and we should see to it that these colleges are endowed. It seems to me that that is the way to secure a better pharmaceutical education. The whole trend of effort in this Association should look toward the establishment of pharmacy as a branch of the great universities, and to see, as far as possible, that these branches are endowed with funds to support them, independently of whether they get students or not.

MR. LLOYD: One point in favor of Prof. Beal's recommendation concerning the recognition of diplomas: it pleases me very much as an individual that our colleges of pharmacy stand so high and are so uniformly excellent—I mean our real colleges of pharmacy—that a diploma would carry with it a valuation which would not require another examination; but I am in favor of examinations, nevertheless. Fifteen years ago—more than that—we met in the State of Ohio. I was opposed then to the recognition of diplomas, for I knew something about what that meant; and I have at the present time more reason to oppose the recognition of diplomas than I had then. I say raise the standard of colleges, as the American Medical Association has done with many colleges, which, had it not been for this action, would be filled to-day with students of a low standard. I wish to report myself again as opposed to the recognition of a diploma for all time simply because it has been earned from an institution of high standing. I know an instance where a graduate went into the circus business and stayed there twenty-one years, and I say that after twenty-one years as advance agent of a circus that man should not be allowed to practice his profession without another examination.

MR. WHITE: This is one of the most interesting parts of the session to me, for the reason that I am a member of our New Jersey Board of Pharmacy. We are one of the oldest Boards in the country. Three or four years ago a new law was enacted, requiring all applicants to pass the examination of the Board of Pharmacy without regard to diplomas, and we find that we are getting a better class before the Board I should certainly be much in favor of making the requirement that students should be graduates of pharmacy. It would give us a better class of men, and would bring the profession up to a higher standard.

MR. KREMERS: As to the advisability of recognizing diplomas, we are all apt to forget some things. I dare say the druggists of this country in general are growing more and more in favor of college education, and that every man should have a college education before being permitted to practice pharmacy. But to recognize the diploma of any college, no matter how good it may be, without conducting a further examination, I think would be radically wrong on the part of the State Board. A college can do some things, but not everything. A student from a college may know how to do a thing theoretically, but he can not always do it practically. Some years ago we had in Wisconsin a kind of reciprocity treaty between the College of Pharmacy and the State Board. The State Board honored us with a visit every year, and took a hand in the examination of students. The advisability of having our diplomas made exchangeable with the Board's certificate without further examination was suggested; and there was some danger of having a bill to that effect passed by the Legislature—the Committee was favorably inclined to that proposition. I take the liberty of stating that it was at my request that the thing did not go through.

You possibly know that I am as great a crank on the subject of higher education as anybody in this audience; but the university does not undertake to make practical pharmacists. We take a young man and attempt to educate him to such a degree that we can turn him over to a practical pharmacist to make a useful pharmacist of him. I am confident that a person coming with a college or university training will make a better apprentice than a person coming merely from the grammar grades or the high school. Even if he is a graduate from the high school, he has not the scientific training that he needs to do some of the simplest things in the drug store. If he simply has a training in the store, and no college education, he may make a thing, but he can not tell you why he makes it. One of the practical difficulties of raising the standard of pharmacy is this: I have for a number of years thought how desirable it would be if the old Northwest would try the experiment. The States of the old Northwest have something of a like or similar educational system, and all of the new States of the West and Southwest have had their educational systems modeled, not so much upon that of the Eastern States, but more after the educational system of the old Northwest Territory. An act which passed our Legislature a few years ago provides that the graduates of the University of Wisconsin, or an institution giving a like or similar course of education, can come before the State Board for examination. No matter whether they have two, three, or five years in college, they must have had two years' drug-store experience in order to qualify for a licentiate certificate. If the other States would do the same in the Northwest, and if the Legislature would require of every one coming before the State Board that he should have a college education, the standard would be raised and a great many difficulties met. All the questions of preliminary training would be met by simply requiring all candidates who present themselves to come up to this educational requirement. If such an experiment were tried it would meet with favor, I am sure, and would settle nine-tenths of the difficulties we have now been discussing for a quarter of a century.

MR. BEAL: I know of at least one institution which makes money, I am sorry to say, by graduating young men who have never seen the town in which the school is located, by the payment of a year's tuition in advance.

MR. REMINGTON: I was opposed ten years ago to the recognition of diplomas, but I found myself in a minority then. The time has come now, though, when I can speak with some hope of a hearing. There are many men here in this meeting who confuse this question. I do not believe there is a college man in this hall—a college professor—who wants to see diplomas recognized as they stand without an examination by the Board. No one wants to see that. We want the State Boards to recognize diplomas in this way: That no man shall be allowed to come up for examination before the Board until he shows a diploma from some recognized and well accredited school. That is the thing in a nut-shell. Limit the men who come before the Boards to men who have diplomas, but examine them and see if they are competent.

Mr. Scoville read a paper on "The Leadership of the Pharmacopœia."

THE LEADERSHIP OF THE PHARMACOPŒIA

BY WILBUR L. SCOVILLE, BOSTON, MASS.

The progress of pharmacy in the United States during the century now closing has been marked by well-defined eras, and in each successive step the influence of the United States Pharmacopœia is clearly discernible. By this I mean that in every important action which has been successfully taken, an ultimate analysis of the causes which led to that action will show that the primary stimulus has come from the Pharmacopœia.

Previous to the year 1820 pharmacy was in a chaotic condition; no schools, no laws, no standards, no restrictions, no unity, and but little of pharmacy as we know it to-day. In 1820 our first National Pharmacopœia was issued. It was the signal for reform to both medicine and pharmacy, and it did not pass unheeded. The first need was more general knowledge, and one year after the Pharmacopœia appeared our first college of pharmacy was organized, to be followed two years later by a second, and then by a third within a decade.

But great reforms begin slowly. The conservative element in human nature will not bear sudden changes. The early pharmacopœias had too little of modern science upon which to base a vigorous campaign, and the mystery of the middle ages still clung. The period from 1820 to 1850 saw but little material progress. It was an inchoative period. The developments of chemistry were paving the way for new advances, but the immediate results were few.

In 1850 pharmacists were called to take part in the revision of the Pharmacopœia, and the time was ripe for a second important step in our progress. Roused to a new sense of unity by that convention, a few of the pharmacists met in New York in 1851 to extend that feeling, and in 1852 this American Pharmaceutical Association was organized. This was the signal for widespread organization.

Then came the period of the Civil War, during which all minor questions were merged in the great question of the nation's future; and from 1860 to 1870 the attention of pharmacists was divided. The close of the civil war saw almost immediately a throwing off of the lethargy which had enveloped the organized colleges and a new activity in their efforts.

In 1870 our smallest state gave the signal for legal restrictions to the practice of pharmacy, by the first law designed to regulate pharmacy. Then the period from 1870 to 1890 saw a rapid crystallizing of the forces at work in the quick succession of city, county and state pharmaceutical associations, the enactment of regulative laws, and the rapid multiplication of colleges of pharmacy. That many mistakes should be made in these precipitous actions is but natural, but these are gradually working out their own remedies.

The Pharmacopœia of 1880 inaugurated another reform in declaring a restrictive war upon the manufacturers of pharmaceutical preparations. The completeness and ability of this Pharmacopœia were recognized from the first, but we have been slow in taking up its challenge. Yet this has in a measure been recognized, and to-day the most prominent question in pharmacy is that promulgated inferentially in the Pharmacopœia of 1880. Meantime the changes in nearly all phases of pharmacy have reacted upon the colleges and resulted in changes in policy, methods and aims. These are even now in the transition stage, and settled conditions do not and cannot yet appear.

In every step of progress thus far, the Pharmacopœia has exerted an indirect and generally unrecognized influence, and has led the way to broader usefulness and greater independence through interdependence. This fact deserves a wider recognition among our pharmacists. In the feverish struggles of the past twenty-five years, we have gotten into a lamentable habit of limiting values to a financial standard, and of criticising adversely all factors which do not directly meet this demand. The Pharmacopœia has suffered much on this account.

The deplorable part of this is not that the financial aspect is prominent. That is all-important and must have its influence. But too great a stress upon this point tends to narrowness, hinders progress, and in the end defeats its own purpose.

The Pharmacopœia pays far more attention to the demands of business than is commonly accredited to it. It is not primarily a business, but is a professional work. Yet it is something more than a book of formulas, or even a book of standards. It meets many business demands, in a way consistent with professional standing, which are seldom recognized.

Questions of the cost of goods, of preservation and storage, of compatibility, and of elegance, all receive consideration, as well as questions of strength, quality, medicinal value and professional standing. No sound factor in pharmaceutical life has been ignored in the Pharmacopœia, but each has been assigned its proper degree of attention.

A general recognition of the influence of the Pharmacopœia upon the development of pharmacy, and a broader view of its purposes and qualities, would aid materially in solving many perplexing questions, and would hasten our progress. The writer is not here defending the Pharmacopœia in its details. It is the work as a whole, considered in its entirety as related to pharmacy and medicine, that is referred to.

Not a microscopic nor even a telescopic view is the need, but a perspective attitude which considers the whole field and assigns to each detail its due importance. In the consideration of any question, the point of view is of the utmost importance. The midst of the fray is not the point from which to judge the battle. It is only for the commander on the heights overlooking the whole field to know the real condition. So in all the struggles of life it is necessary to view the conditions from the outside, away from the perplexing details and excitement of the struggle, in order to know the true tendencies of affairs and to anticipate new conditions.

A near view of any detail magnifies both its size and its importance. It shuts out auxiliary conditions and brings false impressions. It is the relative, not the absolute, importance of any detail which brings the profitable attitude.

It is folly to spend our energies in fighting the strongholds of business, and it is necessary to take the perspective view in order to recognize these clearly.

Much of the criticism which has been heaped upon the Pharmacopœia emanates from a narrow view. It considers a question from one aspect only, and condemns or approves as that aspect may dictate. All aspects of a question are legitimate, but none are fair unless due recognition be given to the others. The Spiritus Odoratus of the 1880 Pharmacopœia is a case in point. The Committee of Revision introduced that preparation as a therapeutic agent. The American pharmacist viewed it as a general toilet water, having no relations to sickness, and condemned it without trial. Our English brethren, recognizing the purpose of the committee, approved it and openly declared it an ideal formula, but at home it had, apparently, no friends, and the preparation was ostracised.

Again, the Pharmacopœia directs that some preparation should be made fresh when wanted, for therapeutic reasons; but some zealous critic, viewing this solely from his own pharmaceutical standpoint, advocates a way of preparing it so that it looks like the official but is permanent, implying that permanence, not efficacy, is the chief desideratum in medicine. So frequently does this occur in literature that an outsider would be almost justified in concluding that the chief pride of the American pharmacist is in his laziness.

Such criticisms are easily answered, yet they are seldom challenged because, perhaps, it is the specific duty of nobody in particular to do so. A special sub-committee for this purpose might well be appointed, not to discourage fair criticism, but to lead to broader views and a higher regard for Pharmacy.

Inherently weak criticisms can do little harm to developed pharmacists, but they may do much harm to the student who, finding these widely promulgated and unanswered, concludes that our National Standard is an impractical and wholly theoretical one. A continual dropping will wear away a stone, and there is much reason for the widely prevalent notions regarding the uselessness of the Pharmacopœia, and for the sneers of the physician.

But it is not only from unsound criticism that the Pharmacopœia suffers, but from a lack of understanding or of appreciation of its contents.

A few years ago one of the members of this Association published a concise syllabus giving the effects of exposure to air and light upon pharmaceutical chemicals. It was a most useful and interesting compilation and was extensively copied, even into foreign journals of a high class; yet throughout the list of journals publishing it the fact remained unnoticed that almost the entire information contained in the article was included in plain language in the Pharmacopœia, where it is at all times accessible and might be collected by an apprentice. This failure to credit was no fault of the author of that compilation, as it was published.

Again, in the frequent articles which appear upon the subject of incompatibilities, the attitude of the Pharmacopœia in regard to some of the more common difficulties is seldom referred to. The inclusion of three different solutions of arsenic, all of the same strength but of different reactions, the insertion of such salts as sodium chlorate and ferric pyrophosphate, or of morphine, strychnine, etc., as free alkaloids, all have their bearing upon questions of compatibility as distinctly as the addition of acetic acid to Basham's mixture, of hypophosphorus acid to syrup of hydriodic acid.

The Pharmacopœia is a model of terse, vigorous, concise English, and every word is there for a purpose. It is this terseness which makes it so much misunderstood. It contains no stuffing, but it is pregnant with thought. To illustrate again, under Solution of Tersulphate of Iron, in the directions for preparing this solution occur the words "then boil." A manufacturer who has personally made and sold many tons of iron preparations once remarked to the author that he has seen the day when he would willingly have given a large sum for the suggestion offered in that one word "boil." It is the secret of the successful manufacture of some of the scale salts of iron, but it had cost him much in time, material and annoyance to learn it for himself.

The revisers of the Pharmacopœia have always been men of exceptional abilities, opportunities and attainments. They have been generous with their knowledge, and have given many practical points of value to the pharmacist in the Pharmacopœia. But because they are tersely stated, and presuppose some knowledge on the part of the reader, it is a sealed volume to a large proportion of its constituents, and the nuggets of knowledge are as securely hidden from them as the ice-covered gold of the Klondike.

The revision committee has wisely encouraged criticism in order to make more perfect the succeeding issues, and the fruits of intelligent criticism are apparent. The work is not infallible, but it is reliable; it is not a fetich, but it merits our confidence; it is not an object of adoration, but it deserves our highest respect; it is not an all-including work, but it is an all-embracing work.

This is the attitude which pharmacists should take toward it, for their own and for their profession's sake. Not to idealize it, but to recognize its aims and values, is the need. This means a change of view on the part of many pharmacists. Partly from apathy, partly from ignorance, and partly from absorption in questions which have been before us of late, the general attitude toward the Pharmacopœia is either indifference or contempt. From this attitude emanates much of the indifference or opposition to professional progress which is the discouragement of workers in all the lines of advancement. Could the rank and file of our pharmacists be made to recognize the past and present influences of the Pharmacopœia, and to feel a wholesome respect for its breadth and power, the task of the reformer would be much simplified. The attitude of the average pharmacist is the key to all questions pharmaceutical.

For such a change in sentiment we must look chiefly to our colleges, though our examining boards can exert much influence. The spirit of the teacher is the first factor in the case, and the manner of presentation is the second. The first I have no right to judge, but the second may admit of a suggestion.

In most of our institutions the Pharmacopœia is presented in a two-fold way, first in a synthetic study, and second in an analytic study. The first seeks to show what the Pharmacopœia is, and the second to show the details of its make up, or its why's. If either study be presented alone, to the temporary exclusion of the other, it amounts to but little. What and why are naturally correlated questions. One accompanies the other as closely as smoke accompanies fire. They spring forth in rapid succession from the four year-old, and they remain unsatisfied in the four-score-year-old, though their relative importance may then be reversed.

Facts alone have little in them to attract attention, unless they directly affect us, when it is the consequences rather than the facts that interest. But facts with reasons appeal to us.

It is not enough to teach that the Pharmacopœial originated, is revised, etc., as laid down in the Historical Introduction and Preface. The reasons for the conception of the work, and its subsequent changes add life to the facts and make them fertile. Nor is it enough to teach that such a number of pills or of tinctures or of mixtures are official, even though each be considered in detail. Some reasons for the selection of these preparations, their peculiarities from the Pharmacopœial standpoint, and the design which the revisers had in mind when they were adopted, make them of interest whether they are being used freely or not.

So in the analytic study. Reasons which apply only to specific topics interest us only as those topics interest; but reasons which link that topic with others of a like nature, and with the subject as a whole, have a wider and deeper interest.

The *what* is the sweeping survey of the field, which brings us a panoramic view of the situation; the *why* is the critical study of details, and is incomplete unless the *what* is kept in mind.

The two views do not necessarily mean repetitions. The synthetic study is usually made from the physical standpoint, and the analytic from the chemical. A botanical and therapeutical classification could be added to advantage, if time permitted. While many facts might be thus repeated, the change of view makes them of increasing interest, and also develops their relative importance. The main object of study then becomes transferred from a mass of details which the pharmacist should know but finds difficult to remember, to a conception of professional pharmacy as a whole, in which the details are but the dovetailing parts. This puts the emphasis where it can accomplish the most for the student and for pharmacy.

Could we implant in the minds of the students of our colleges this higher regard for the breadth and power and discernment of the Pharmacopœia, the tide would be turned for the betterment of pharmacy.

The natural course of things will force the pharmacist to think deeply upon the commercial problems of pharmacy. Our schools cannot afford to belittle or ignore the vital nature of these questions, but they cannot deal deeply with them, and it is wise, during the few months that the student is under directly professional influences, to inoculate him as deeply as possible with a regard for the professional aspect of his calling. Get him to think little of what is useless and much of what is useful; to study not what he cannot do but what he can do; to search deeper the possibilities of pharmacy, and resist some of the allurements of outside attractions.

This movement has already begun, and those who have tried it have found many practical aspects to it. It is not merely an ideal, though there is much of the ideal in it. But every man has, of necessity, some ideal in mind, to which he never fully attains, but which profoundly affects his life and happiness. Can the pharmacist have a better or more promising ideal than this? And if the pharmacist does not deeply respect his profession, how can he expect that the physician or the public will do so?

THE CHAIRMAN: Without objection, the paper will be received and referred to the Committee on Publication. It is a very interesting paper on a very interesting subject, and one worthy of our consideration.

The next paper is on "Some Elements in Pharmaceutical Teaching," by Dr. T. D. Reed, of Montreal, Canada.

Dr. Reed arose amid applause and read his paper, as follows:

SOME ELEMENTS IN PHARMACEUTICAL TEACHING.

BY T. D. REED, M. D.

The teaching in Medical, Pharmaceutical, Dental, Eclectic and Natural Science Faculties has been very largely didactic, and, from unavoidable conditions, will be for a long time to come.

After considerable experience and much reflection, the writer has formulated certain principles which he endeavors to keep before himself in pharmaceutical teaching. These are presented without any claim for originality, but that the subject may be brought up for discussion, and opportunity given for the expression of ideas, and the modification and improvement of methods, by the able and enthusiastic teachers assembled in the meeting of the American Pharmaceutical Association.

The heads under which I place my sections are Simplicity, Illustration, Repetition, Questioning.

SIMPLICITY.

By simplicity I mean more than simplification, or clearing up of difficult points. This is a necessary duty of a teacher, and a difficult one also, as it requires not only a thorough knowledge of the subject, but also mental aptitude for taking the learner's place. I have the idea that our teaching should be from the bottom, that is, we must go to the elementary facts. A teacher's ambition to shine as a very learned man, and the fame of the school as a fountain of profound science, are conditions to be placed second to the needs of the raw students who come before us. In all our pharmaceutical schools we are safe in assuming that a portion of the class will be persons of untrained minds, individuals whose capacity for grasping scientific truths and principles is very small. In graded schools of three or four sessions, the work is of course progressive, and the final classes necessarily quite advanced as compared with the first. Nevertheless the principle here enunciated still holds. Let the teaching be elementary, relatively to the nominal grade, whatever that may be.

My plea is for a large amount of attention to the elementary facts of the various branches of knowledge which go to make up a pharmaceutical course.

ILLUSTRATION.

In Physics and Chemistry copious illustration and experimentation are manifestly quite necessary. The reading of a page referring to the facts of a physical principle or chemical reaction is generally considered by the average student as particularly dry. Sufficient apparatus and materials must therefore be on hand to make the teaching through the eye as well as through the ear.

In Materia Medica it is desirable that the drug which is being described should be held up before the class, and when possible a small sample furnished to each member, so that as the description goes on, the student may see for himself the points indicated.

Constant use should be made of the blackboard, and in the histological description of organic drugs the projection lantern is very useful.

REPETITION.

I consider that the first five or ten minutes of the hour may be profitably spent in a recapitulation of the facts of the matter gone over at the previous lecture. This not only in the interest of those who were absent, and we have to count on some unavoidable absences every time, but also as a reiteration for the benefit of the class in general. In the course of the lecture, also, any statement which is felt to be somewhat involved, should be repeated without waiting for a request from a member of the class. The bright and receptive minds in the benches must submit to the slower progress of the instruction in the interest of the other kind, who, generally in the majority, should have the first thought of the altruistic instructor.

QUESTIONING.

Until we have the Z-rays, by which we can discover the intellectual contents of the brain cells of our students, we must continue to ask questions to find out what they know. In the large and well-equipped schools an officer is told off to do the questioning on the matter of the lectures at stated intervals during the course, the professor desiring to escape so humble a duty. There is, however, a distinct advantage to the teacher himself in doing the "quizzing"—the answers given, indicating the learner's conception and understanding of the principles enunciated by the teacher. The teacher thus subjects himself to a test, from the results of which he may improve his pedagogical methods.

As to the amount of time to be given to this exercise opinions vary. Some have adopted the plan of devoting some time immediately after the lecture. This method is not often followed. My own preference is to give from four to eight lectures, and then devote the whole hour to examination by questioning on what has been gone over.

Judicious questions require thought in preparation. There is an art in questioning, and it is not so easy as some who have not had experience in the work might think. It is seldom desirable to give questions which can be answered by "yes" or "no." Our effort should be to put questions which require some reflective and constructive work in the mind of the student to frame an answer. For example, the question, "Has gentian a bitter taste?" is an inquiry which is without pedagogical benefit. The form, What are the principal facts in the Pharmacognosy—Pharmacy—Therapeutics of Gentian? would be preferable.

In the case of a large class it is a pedagogical principle to give the question first, and select a student to be the answerer, the idea being to get the whole class in an expectant mood, as any one is liable to be called upon.

Physics and Chemistry give opportunity for calculations, and these are to be given as exercises quite frequently, training in accuracy being of special benefit to pharmaceutical students.

Montreal, July 12, 1898.

The paper was received and referred for publication.

Dr. Bartley read a paper on "Accessory Pharmaceutical Education."

ACCESSORY PHARMACEUTICAL EDUCATION.

BY E. H. BARTLEY, BROOKLYN, N. Y.

There is a disposition among pharmaceutical colleges to extend the course of study. This is not peculiar to pharmaceutical colleges, but is the spirit of the age in all colleges and higher institutions of learning. It is to be expected that an increase in the time required of the student must afford an increased breadth of education. In this increase in pharmaceutical education we must remember that we can not go faster than public sentiment among pharmacists will warrant. The needs of the pharmacist must continue to be the guide as to what the schools should teach. A technical school must always keep in mind what the student is to do with his education after he leaves the school. While it would be profitable for the average student to spend three or four years in the study of the subjects of chemistry, botany, manipulative pharmacy, materia medica, etc., we find that students are not willing to spend the time to do this, but demand other studies. To what extent can we profitably extend the course of study to embrace other branches of knowledge? Perhaps this question can easily be answered by those schools which are fortunate enough to be departments of universities. In spite of a tendency in recent times for schools of pharmacy to seek the fostering care of the universities, there are still a considerable number of schools that are not so situated. For such, an increase in the number of subjects taught entails an increase in faculty and equipment which makes them hesitate. The requirements of a college are so much more now than they were a few years ago, that it is a serious matter to undertake to maintain a properly equipped college. In the state of New York, a charter to establish a college can not be obtained until the promoters can show a substantial endowment or sufficient funds to insure its success. The maintenance of a college of pharmacy presupposes a financial ability to provide an equipment sufficient to properly carry out such a course of study as the needs of the present day demand.

We occasionally hear the criticism that the colleges do not fit young men and women for business as pharmacists, as they should, because after they are graduated they do not know everything that a pharmacist ought to know. If this be true, the answer is that the young men we have to teach cannot learn everything in the short time that their employers are willing to allow them for their college course. There are some things, too, that the colleges ought to teach that are not taught for the lack of time. Few colleges attempt to teach the business methods that are so essential to the success of a pharmacist.

The general depression in business during the past few years, has been felt by pharmacists as well as by other tradesmen. Many complaints are heard on the floor of this Association, about the ruination of the business from one cause or another. It is a fact, however, that some of you get along fairly well, while others do not. A somewhat careful observation of successful and unsuccessful pharmacists has convinced me that success comes, as one would expect, from a close attention to the commercial end of the business. The proprietor who sits in a back room and allows a boy to meet his customers, to find out what they want and come and tell him, is usually in a bad humor when he comes out, and repels rather than attracts the would-be buyer. While it is a difficult matter to teach business tact and successful business methods, I think something may be done in this direction. This might be done by a series of talks, not by the regular scientific faculty, but by recognized successful pharmacists. Such talks to senior students would give them an opportunity to learn something of the methods that had been successful in the particular community in which the speaker did business. By a judicious selection of men, representing different localities, a fair knowledge might be imparted of successful business methods. The above plan of plain talks by successful business pharmacists, is to be inaugurated by the school with which I am connected during the coming session.

A number of colleges of pharmacy give some instruction in hygiene and sanitary science. This is to be commended when it can be done without conflicting with the regular time-honored studies. From the nature of things, the pharmacist is, next to the physician, most often consulted by the general public on sanitary matters. He should know something about disinfectants and disinfection, the principles of ventilation, water pollution, water filtration, etc. From the fact that persons who are the victims of accidents are so often taken to the nearest pharmacy, the pharmacists should know something of the subjects generally grouped under the head of "first aids to the injured." For humanitarian reasons, he should do something, and is expected to do something. With so much at hand with which he might relieve distress, or even save life, before the physician arrives, it seems criminal for him to stand dumb in an emergency. In cases of poisoning, he should know symptoms and antidotes. He should know the value of evidence, and know enough to preserve vomited matters or other discharges in suspected cases. Under the head of sanitary science, the instruction of analytical chemistry might be extended to the examination of milk, for adulterations and for clinical purposes. The chemical examination, and even the bacteriological examination of potable waters, and examination of foods, might receive attention.

There may be a difference of opinion as to how far a pharmacist ought to educate himself in physiology, physiological chemistry, electricity and photography. If we accept the theory that he should know the properties and uses of all the substances intended for internal use, which he sells, he should have some knowledge of the various food products he daily handles. He might be expected to know what constitutes a food and what a stimulant, and be able to answer intelligently some of the many questions put to him by the public on such questions. It is quite possible, of course, to conduct a pharmacy without such knowledge, and indeed without any knowledge of botany or of the difference between a good and a poor sample of any vegetable drug. In other words, it is possible to reduce the drug business to a mere mercantile trading in ready-made pharmaceutical preparations. But this is not what you gentlemen come here for, nor is it what you wish the colleges to inculcate in the minds of the students you send us.

It has been advised that the schools should teach only what the students are going to need in the drug store. In theory this is rational enough, but in practice it is difficult to determine what a student will need. There are certain subjects that the consensus of opinion has determined to be essentials, and these should receive first attention. I am not decrying these, but am discussing accessories to these studies. While it may be considered an essential to teach a student how to go about making a good preparation of beef, wine and iron, it might be a good thing for him to know that the preparation, when it is finished, contains no beef at all, and is simply a stimulant containing iron. It might not be amiss for him to know that an invalid will starve to death on beef tea, clam broth, oyster broth, or extract of beef. There is a field of considerable importance upon which the young pharmacist should enter. The demands of modern scientific diagnosis upon the time and skill of the physician are such as to make it almost impossible for him to do the work himself. He must in the near future look to others to do a large part of it. In the course of a busy practice, should a physician attempt to make all the chemical and microscopical examinations he ought to make for a proper study of his cases, it would require nearly half his time. I see no reason why the pharmacist should not prepare himself to do such work, and receive just compensation for it. I know physicians who would be glad to have some one, in whose competency they have confidence, to do such work for them. Competency is of first importance, and this can only be attained by proper training under competent instructors.

Such training should consist in a thorough course in the chemical and microscopical examination of urine, with instruction on the bearing of the findings upon diagnosis of disease. This would include the pathological variations in normal constituents, as well as the presence of abnormal constituents. This would involve considerable instruction in physiological chemistry, and a discussion of the meaning of the variations in the various constituents from the normal. It would involve certain quantitative estimations of certain substances, not from the view of the pure chemist, but from the clinician's standpoint. I believe this is possible of presentation to pharmaceutical students during the third year of study. Such training should also include a study of milk from the point of view of its digestibility, and its variation from normal milk so as to detect adulterations, and to determine, in the case of human milk, its normality or its abnormality.

The preparation of imitations of human milk from cow's milk is another bearing of the subject that is now of great importance.

The chemical and microscopical examination of blood and fæces is not without the region of possibility of any well trained manipulator. A fair amount of manipulative skill, and a little experience, is all that is required to conduct any of these examinations.

Toxicological examinations in criminal cases are not to be recommended to any but thoroughly trained chemists, with well-equipped laboratories. An extensive course in toxicology, therefore, I do not regard as advisable in a college of pharmacy. The rudiments of such a course may be of some service. Such a course in clinical chemistry and microscopy, while it could not be regarded as a part of the study of pharmacy, would serve to train the student in accurate manipulation.

While such training is not strictly pharmacy, I am led by experience to say that it is very much needed in the practice of pharmacy. I have found that it is very difficult to inculcate habits of accuracy in pharmaceutical students. The word "about" seems to occupy entirely too prominent a place in their vocabulary, and where it should have no place at all. I would like to emphasize the importance of accuracy, neatness and fidelity, to the minutest details, in pharmaceutical work, as well as in chemical work, where it is a sine qua non.

Slouching in manipulative work is too frequent, and very difficult to prevent. The word "about" should be abolished from the college laboratory, which is most difficult to do as long as it is the rule in the store laboratory. One great drawback in pharmaceutical education in the colleges is in the slouchy habits of work of our students when they come to us. It is very difficult to break up in a few months the habits formed during several years in the store.

At the present day proprietors seldom assume any supervision or responsibility in the training of young men—I will not call them apprentices, which they are not—who work in their stores.

We may reasonably wish for a return of the days of real apprenticeship, when the pharmacist was bound to take charge of the young man and try to make a pharmacist of him and teach him something. This lack of what we may call home training explains why some of our best schools of pharmacy have thought best to give no credit to store experience. This may also explain why one prominent school which has always given credit for such experience, has shown its apparent lack of confidence in it by publishing as one of its requirements for graduation, that the student must have had "fully four years' practical experience with a person or persons competent to conduct the business of a dispensing pharmacy."

We have often heard the recommendation, at the meeting of this Association, that students of pharmacy be required to present evidence of a fairly good English education before beginning the study of pharmacy. This is very desirable, but how can it be brought about? The large majority of the students who present themselves at the schools, especially in the large cities, have already been in a pharmacy for two or more years, and possess the merest rudiments of primary school education. Should the schools of pharmacy reject such, it would not keep them out of the pharmacies, but send them before the Boards, where they would get their license without any other training than that they get in the store, assisted by a little cramming for the examination. When a young man has made up his mind to become a pharmacist, he will usually get there by the road of the least resistance. If that is through the board of pharmacy, he will take that road. There can be no question that a systematic course of instruction is better for our young men who propose to become the future pharmacists than store experience alone. When the state makes a college course a prerequisite for examination for a license to practice, then the schools can and will be very glad to shut out those who lack sufficient preliminary education. In the mean time we must look to those who are responsible for starting the apprentice on the road, for help in shutting out those poorly prepared students, who give us so much trouble in our efforts to educate them in the science of pharmacy and these allied subjects.

On motion, the paper was received and referred for publication.

MR. CASPARI: The remarks of the speaker are in direct line with the experience of all the college teachers, and lead directly to the view entertained by so many, that a certificate of four years' experience in a drug store is not essential for graduation from a college. This Association, as the members will recollect, has advised that apothecaries should be more circumspect in the selection of their apprentices, and in the training of these young men. Much of the difficulty existing to-day is due to the fact that the apothecary is careless in the selection of his apprentices, and still more careless in his guidance and training. It was different twenty-five or thirty years ago, when the proprietor of a store was probably the only man from whom the apprentice derived a knowledge of the practical details of pharmacy. But we are apt to think now that it is not necessary for us to do anything, as the colleges make all necessary provision. The pharmacists can materilly aid the colleges by selecting apprentices with more care, and I think the result of college education would thereby be made appreciably greater. This is the experience all over the country.

Mr. A. R. Dohme read a paper upon "Secretionary Analysis and Bacteriological Examinations by Pharmacists."

SECRETIONARY ANALYSIS AND BACTERIOLOGICAL EXAMINATIONS AS DESIRABLE BRANCHES OF STUDY AND PRACTICE FOR PHARMACISTS.

BY ALFRED R. L. DOHME, PH. D.

We have recently heard considerable discussion of how little has been accomplished by this Association for the commercial side of pharmacy, and that while aiding and improving the scientific and educational side, it has not evolved a remedy for the elimination of the cutting evil or the decline in profits of the retail drug business. This is true, but has any association been successful, and have this and other associations not made numerous efforts? It is more than likely that the reason for this ill-success is that no remedy exists to cure the ill. Cutting will never be overcome, for even if the signature of every druggist in the land were obtained to a resolution abolishing it, cutting would still go on; for among so many individuals there are bound to be, and have always been since the advent of man upon this terrestrial globe, a certain number of unscrupulous men who will not live up to their agreements. Be it not inferred herefrom that cutters are such men, for whereas some no doubt are, the majority of them are fully equal to their non-cutting brethren in respect of character and integrity. They openly acknowledge that they are cutters, and smile while they wonder that all are not, for that it pays their pronounced success proves beyond argumentation. Such men, being shrewd business men, and in business for what they can get out of it, would naturally not change their tactics to please the desires and humors of their fellow-pharmacists. Since it pays and is not illegal, there will always be cutters, and for the same reason will department stores more and more take up the trading in proprietary medicines and druggists' sundries at cut prices. What any association can effect to stop, it is hard to conceive, since legislation against it is impossible, being unconstitutional, and harsh methods directed against proprietary manufacturers will eventually lead these to forsake the druggist, and either open agencies of their own or favor the cutter and department store. It is hence not a fault of this association that cutting has not been eliminated, or that manufacturers of proprietary medicines see fit to advance their prices and make the jobber and retailer pay the war tax. Nothing that this association could do would force the hand of the manufacturer, for in a measure he is independent of the retailer and jobber, and can do without their good will if necessary; not that he by any means most likely desires to court their ill-will. If this association had on its membership roll all the retail pharmacists of the land, then it could compel the manufacturer to come to terms; but with its very small percentage of members, anything that it would resolve upon would but little influence the manufacturers.

To return to the subject of this paper, there is another means of making the pharmacy yield more revenue, and that is the incorporation in it of a laboratory outfit, and the knowledge of the owner or manager for carrying on secretionary analyses and bacteriological examinations for physicians. The prime cause why the retail pharmacy does not pay is not because cutters exist and thrive, but because there are too many pharmacies in this country. There are too many pharmacists because there are too many colleges of pharmacy, and there are too many colleges of pharmacy because too many unfitted men who were never cut out for pharmacists are induced to take up pharmacy as a calling and attend these colleges. Therefore, for their self-preservation, pharmacists should endeavor to induce colleges to raise their requirements for admission, increase the length and difficulties of their courses and thereby also the expenses of such courses. Here more can be accomplished to elevate the standing and profitableness of the drug business than by eliminating cutting and organizing druggists' manufacturing associations. It is in this direction that the subject of this paper tends, for the adoption of courses in secretionary analysis and bacteriological examination not only enlarges and makes more difficult the college course of pharmacy, but increases the earning capacity of the pharmacist and brings him in closer touch with the physician.

The physician is the best friend of the pharmacist, for from him do all the blessings of the prescription business flow, and profits on this are considerably above those on the proprietary article. Whatever hence induces closer friendship and intercourse with the exponents of the Æsculapian art, tends to the betterment of the pharmacist's business. We all know that excretions are being more and more examined every day by physicians in the diagnosis of disease, and that nearly all physicians of not more than ten years' standing, and many also of the years preceding this, have been taught that the most reliable diagnosis of many diseases, in fact, most diseases, is the result of an examination of the excretions or bacteria of the patient. We all know that most physicians are not in a position to make these examinations and analyses, because they have neither the time nor the facilities. Some physicians have appreciated this state of affairs and have made this very work their specialty, and are making money at it. I know of a physician in this city who has so much to do in this line that his health gave way this spring from overwork, and he told me that he made more out of it than out of regular practice. Having become proficient at the work, he is an authority hereabouts, and the physicians willingly pay him his regular fee, which varies according to the extent and nature of the work. Of course, when he makes an analysis of urine he does not merely apply litmus paper, nitric acid and Fehling's solution. He finds out the story the urine has to tell to a skilled operator in this work, and, when he reports to the physician, the latter has facts in his possession that nearly always enable him to decide what is the disease of his patient.

I feel that among my hearers are some that say, where will the pharmacist find the time for acquiring such knowledge and making such analyses? and again, others who say, all my physicians expect me to do such work gratis, because even $1.00 is rather a good charge for litmus papers and nitric acid. To the first, I answer that the college of pharmacy is the proper place for courses of analysis of this kind, and they should extend throughout the one winter with laboratory work. Courses in secretionary analysis and bacteriological examination should be incorporated in pharmaceutical college courses, and should be part of the work required for the degree of graduate in pharmacy, or certainly of pharmaceutical chemist. When I advocate such courses, I am referring more especially to future students of pharmacy, although no reason exists why any pharmacist should not avail of these courses and prepare himself for the practical working of them in his pharmacy. As to where he will find time and place, I would say that with one or more clerks, according to the location and size of his store and business, he should find time at certain hours of the day to do the work, or have one of his clerks do it, if he prefers to be in front to see customers. He will not need, he will find, more apparatus than he now has, except, perhaps, a good microscope and staining agents, but he will need more time and more care than he probably now thinks necessary for the work, if it is to be of commercial value to him. He can hardly expect to receive a fee for work that is merely superficial, occupies him only five minutes, and consists merely of the application of litmus, nitric acid and Fehling's solution. The extent and quality of his work will depend in some measure upon the kind of physician he is working for. A physician who does not look for more than the above-mentioned test-tubing, of course, will pay little or no fee, and would not know how to appreciate the refined and, diagnostically speaking, important and valuable work the pharmacist is capable of. From him no fees, or very small ones, are only to be looked for in any case; but such men do not often require these analyses and examinations in their practice. If the pharmacist desires to perform these in return for "thank you," and continued patronage, that is for him to decide. Suffice it to say, if the pharmacist wishes to make a success of this work, and he does or he would not undertake it and spend money to acquire it, he will become expert and proficient in it, and his say-so will represent to a competent and painstaking physician a quantity of definite value, and will be paid for accordingly. It may appear chimerical, and too deep in the future for some, and entirely impracticable for others, but I venture to assert that it is destined to come, and those of our pharmacists who first take it up will reap the most benefit from it.

Physicians have for some time had instruction in this work in their college courses, and some have made practical use of their acquired knowledge, especially at first, when patients were few and spare time abundant; but as their practice grew they found no time for the work, and either neglected it altogether, or had it done at some specialist's laboratory, or at that of the nearest dispensary or hospital. They thus not being in a position to put into practice what they have learned, are really not as justified in studying it as the pharmacist, who is eminently fitted at all times to do just this work, if he is possessed of the knowledge to do so. There can hence be no question, I think, that many, if not all, pharmacists are in a position to avail themselves of a thorough knowledge of secretionary analysis and bacteriological examination.

Now as to the work itself. Some knowing ones have averred that to know how to make a complete and reliable analysis of urine will take a man many years, and it is hence impracticable to load such work on the pharmacist's shoulders. To this I reply that there is probably no disease mentioned in any treatise on medicine that would not require many years for its complete mastery, and on which volumes and volumes have not been written. This is no argument, however, against the fact that this disease is treated successfully every day in the year probably. Though Neubaur and Vogel and others have written 600 page books on the analysis of urine alone, and a complete treatise on bacteriology would occupy probably double that number of pages, does it require the entire matter of these ponderous volumes to make an analysis successfully? By no means. I profess to be a chemist, and to be fairly versed in chemical and pharmaceutical literature, but there is not a single volume in my library that I lay any claim to have mastered and to know perfectly. I have no ambition to so know them, but I can at a moment's notice refer to any of them, and get what I need for my work. So it is with Neubaur and Vogel. A student of secretionary analysis needs only to become thoroughly versed in the objects and general methods of the same; the details he can easily look up as he needs them in Neubauer and Vogel, or any reliable text-book. What the student needs is an acquaintance with the various methods and apparatus necessary for the work, and considerable experience in applying them to all kinds of specimens for examination. The best authorities on the subjects should be studied, and a comprehensive survey of the field be made, thus acquainting the student with what he may expect to meet in his work. Special cases, new bacteria, etc., may come up in the course of his work, but all such will interest him by virtue of their novelty, and if he meets with difficulty in deciphering them, he can very readily apply to his instructor or some fellow authority for assistance and advice.

Just what he will be called upon to analyze or examine, I will not here enumerate, as it would unnecessarily complicate and lengthen this paper; but they would include the analysis of urine, blood, lymph, perspiration, gravel, cystic and other fluids and solids of the body, together with the microscopical examination of sputum, blood, tissue, deposits and growths from the various parts of the body, etc. Some energetic and pushing pharmacists have already introduced such laboratories and apparatus in their stores, and I have just learned since the advent of this meeting that one of our members present at this meeting, Mr. Westcott, of Atlantic City, N. J., has done so, and is more than pleased with the result. I know of another member present at this meeting who, while here, is receiving instruction in this work from one of the specialists of the same at the Johns Hopkins University. I refer to Mr. H. Pleugge, of Charleston, S. C. This matter is so important, and I believe so certain to prove of great value to pharmacists both scientifically and commercially, that I cannot refrain from urging upon this Section the desirability of giving it the attention it merits and discussing it carefully and fully. If this paper serves to bring before the pharmacists of the country the value and importance of the subject, and induces efforts to introduce it both in the pharmacy and especially in the college, I will feel amply repaid, for I for one feel fully convinced that it will ultimately and before long prove to be a source of no inconsiderable revenue to the scientifically educated and ambitiously inclined pharmacist.

I cannot in justice to myself and my friend, Mr. W. C. Powell, of Snow Hill, Md., the President of the Maryland Pharmaceutical Association for 1897–1898, close this paper without stating that the suggestion for this work, in part at least, is due to him, and was embodied by him in his annual address at our recent meeting at the Blue Mountain House in June last. It may also be of interest to add that our State Association, at that meeting, went on record as favoring and recommending the incorporation of this work in the pharmacies of this State. It may also be of interest to know that several pharmacists in New York City have for some years introduced this work in their stores, and I believe I am correctly informed that one of them does as much as $10,000 to $12,000 in it annually. One of the chemists in the laboratory of the pharmacy I refer to was a fellow-student of mine at the Johns Hopkins University, where he received his doctor's degree, and it was he who gave me the information and an account of the kind and extent of the work they do for the physicians of Greater New York. We cannot all do as much as this pharmacist does, but as it is a new departure, there can be no reason why each one in his particular city should not do a proportionate amount of it, or at any rate increase his income in proportion to his energy and ability.

Baltimore, September 1, 1898.

On motion, the paper was received and referred to the Publication Committee.

MR. FREERICKS: I have given this subject much thought, and I quite agree with Mr. Dohme, that the originator of a system of that kind in a city would be a successful man in that particular branch. But I should like to ask Mr. Dohme whether he thinks that, if a course of that kind were given in our colleges, and many would take it up, it would be a profitable field for the pharmacist?

DR. BARTLEY: When I listened to the reading of this paper, I was very sorry I had not read my paper in full, because it contained almost the identical idea. So I can heartily endorse all Mr. Dohme has said on that subject, except that he is, you may say, more Utopian than I am in his idea of what may be accomplished. But I think it would be necessary to draw certain limits as to putting these things into the hands of all druggists; it should be in the hands of competent men only. The germs of diphtheria, for instance, about a store should only be handled by an expert bacteriologist. In our colleges, the course should be an optional one for some time to come, and only certain men, who have an inclination in that direction, should be given this education. But that such a thing is coming, there is no doubt. I have been practicing a little more than ten years—I have been teaching more than twenty-five years; and I know in my own practice, if I attempted to make the examinations I ought to make for a proper study of my cases, I would have no time to see my patients; and yet I have all the paraphernalia.

MR. HYNSON: I am loath to oppose anything Mr. Dohme advocates, and I may be wrong in opposing him in this matter; but I want to suggest the effect it may have on our relations with the specialists, of whom Mr. Dohme speaks. I should think the pharmacist should be careful how he goes into this matter, if he has to antagonize any class of the medical profession. I doubt whether, as a matter of policy, it is to the best interest of the druggist to do that. In small towns, where there are no specialists in that line, it might be expedient; but in the cities, where we have trained medical men who have devoted their whole time to this matter, I question the policy of it. Until the druggist does become a specialist in his line, his relationship to the physician will not be what it ought to be. I am in favor of that. I will not oppose this matter, but ask you to weigh carefully and determine whether it is advisable for the pharmacist to create this antagonism.

MR. SCOVILLE: I do not believe the time will come for a long while when the financial conditions will permit us to go into bacteriology at all. Practically, there are now but four diseases that have been diagnosed as due to bacteria. The most common of these is consumption. That is a very simple operation, and any pharmacist can learn it in a short time; but it requires a good microscope—a good immersion lens—and that will cost him a considerable sum. I know it is said to have been done successfully without this means, but no man who has had experience in this matter would be satisfied with a diagnosis unless it was made with an immersion lens. But is there enough in it to justify the average pharmacist in getting the necessary apparatus? As to the diphtheria bacillus, it is very difficult of certain and accurate detection, and experts having ample opportunity to know about it, often differ concerning it. And then there is the anthrax bacillus, which is comparatively rare; also the typhoid bacillus. But the only one the pharmacist can practically consider is consumption, and for that he must have a special microscopic lens, and the demand for his services would be limited. The study of bacteriology may be a good enough thing in itself, as broadening the pharmacist's general view; but I do not believe he can make it pay, from a financial standpoint, for a long time to come, if he ever does.

DR. REED: It is not a new thing to suggest to pharmacists to attempt the chemical analysis of urine, but if there is any actual pharmacist who has made anything of consequence out of it, anything rising to the dignity of an income or salary, I would like to know it. It is out of the question to expect the ordinary pharmacist to be able to instruct the physician as to the malignancy of a tumor, for instance; that would have to be sent to a bacteriologist for microscopic examination. The physician does not trust the average pharmacist to give him the diagnosis of a disease. It is a very interesting study, and I won't discourage it, and I like to teach it myself to my students; but if any pharmacist, as a pharmacist, expects to make any money out of this thing, I think he will be disappointed. If he has had experience and skill enough to make these analyses, then he is a specialist, and he need not practice pharmacy any longer.

MR. BEAL: I confess I am very heartily in sympathy with the spirit and subject of Mr. Dohme's paper, and also that of Dr. Bartley, I believe that the world is ours, and the fulness thereof, and we should enter in and possess it. I think the arguments on the other side, sifted down to their finality, will tend to support much that is contained in the paper. How do these things get into the hands of the physicians? By virtue of the fact that the pharmacists neglect their opportunity.

MR. DOHME: In reply to the first speaker's question, I do not think there would be any danger of everybody taking up bacteriology and secretionary analysis, because everybody is not fitted for it, and only a comparatively few—especially at first—will have the courage to make a practical use of it. But if you do not make a start, and give us a course in it in the colleges, of course nothing will be learned. The specialist that I referred to does not have any general practice, and does not want any. As long as he is not a practicing physician, you expect no favors of the specialist, and can afford to be in competition with him.

In reference to Prof. Scoville's remarks, if the pharmacist does not make these examinations, who will do so? In this city I know our Board of Health has very few analyses made, because of the difficulty of getting them. At this season of the year, for instance, where could you have it done? The colleges are closed, and the specialists away on a vacation probably. The pharmacist has his place of business open all the year round, and the doctor can have it made there at any time. Every year, one or more diseases is attributed to bacteria—a bacillus—and a large majority of them will be found to be due to that cause in all probability; and as they increase, of course the demand for the work will increase.

Of course, it would be suicidal for the colleges to introduce anything but a complete and thorough course, under the charge of a man of authority on the subject, so that the physician would have confidence in the result of the pharmacist's analysis; and of course every pupil will not become proficient, but some of them will. If everybody became an expert, there would be nothing in it for any one; but those best fitted for it will make a success. The two or three specialists in this city have more than they can do. They earn a handsome income, and get sick from the amount of work they have; and it is very much the same way in New York in the colleges there. The more the pharmacists that take it up, the better the facilities for teaching it.

DR. REED: It is almost impossible to make anything out of urinary analysis. As to the other things, it would be almost impossible, I think, to get the matter to test.

MR. STEVENS: As one of the gentlemen has remarked, the course should be made optional. Only a small per cent. would be efficient in this line of work—four per cent., maybe—and the other ninety-six per cent. had better spend their time at something else.

MR. RYAN: I move that a vote of thanks be extended to the gentlemen who have presented papers, but which have not been read, and that these papers be read by title, so that we may get through with the work of this Section, for it is getting late.

Dr. Lowe seconded the motion, and it prevailed.

THE CHAIRMAN: The papers not read, and the authors, are as follows:

The Care and Control of Prescriptions. By Jas. M. Good.
Simplified Orthography. By Seward W. Williams.
Report on Preliminary Education Requirement. By J. H. Beal.
Pharmaceutical Reorganization. By Edw. Kremers.
Poison; Its Legal Definition and Sale. By F. H. Freericks.
Pharmaceutical Education, Pharmacy Board Examinations and the Present and Future Status of Pharmacy. By Alfred B. Huested.
Practical Pharmaceutical Legislation. By H. G. Webster.
Final Examinations. By L. E. Sayre.
Physics, The Foundation of Pharmaceutical Pedagogics. By Joseph Feil.
The Pharmacist in Mexico. By B. F. G. Egeling, M. D.
The U. S. Pharmacopœia and the Medical Profession. By F. E. Stewart, M. D.
The School of Practical Experience. By E. L. Patch.
Outline of a Course in Organic Chemistry for Pharmacists. By F. J. Wulling.

THE CHAIRMAN: It is understood that these papers are received and referred to the Committee on Publication. The list includes some very excellent papers.

The next thing in order is the installation of officers, and I will ask Prof. Lloyd to conduct the newly-elected Chairman, Dr. Lyons, to the platform, and Mr. Thompson to bring forward the new Secretary, Prof. Lowe.

Mr. Lloyd performed the office assigned him, and the chair introduced Dr. Lyons to the Section.

DR. LYONS: It is an honor to be placed at the head of any Section of the American Pharmaceutical Association. It is also a great responsibility. I have been more than ever impressed at this meeting with the great force that has been gathering headway in the years past in this Association. I have seen during the last ten years very little of its work, and in coming back to the Association I am impressed to see how the little rills have come together and swelled into a stream that is steadily going on; and to be placed in a prominent position in such a movement is a great responsibility. I should be very unwilling to shoulder any such responsibility if I did not know the members of this Association so well—if I did not know that it is not the officers, but the rank and file, that are unitedly doing the work. Gentlemen, I thank you for the honor, and for the responsibility. (Applause).

Mr. Thompson conducted Prof. Lowe to the platform, and the Chair introduced him.

DR. LOWE: Mr. Chairman and gentlemen of the American Pharmaceutical Association, there is an old saying that speech is silver, but silence is golden. I think that applicable to-day, under the conditions of the lateness of the hour and the extreme heat. "Let not him that putteth on his armor boast like him that taketh it off." I am just putting on the armor, and I do not want to say much about it. I think it better to let the work speak for itself.

THE CHAIRMAN: There is another matter—that of appointment of associate members.

MR. SHEPPARD: I move that the appointment of associate members be left with the officers, the Chairman and Secretary.

Mr. Dohme seconded the motion, and it was carried.

On motion of Mr. Beal, the reading of the minutes was dispensed with, and they were approved in advance.

On motion of Mr. Ryan, duly seconded, the Section then adjourned.

PAPERS READ BY TITLE.

THE CARE AND CONTROL OF PRESCRIPTIONS.

BY J. M. GOOD, ST. LOUIS, MO.

Should the druggist be required by law to retain the original of every prescription compounded by him, and to furnish a copy only on request of the patient or of the physician?

The following is a section in the Missouri Pharmacy Law:

"Every druggist, proprietor of a drug store or pharmacist, shall carefully preserve all prescriptions compounded by him or those in his employ, numbering, dating and filing them in the order in which they are compounded, and shall produce the same in court or before any grand jury whenever thereto lawfully required, and on failing, neglecting or refusing to do so, shall be deemed guilty of a misdemeanor, and on conviction shall be punished by a fine of not less than fifty nor more than one hundred dollars."

By the enactment of this section the law-makers were inspired not so much with a desire to protect the physician and the druggist, as to provide a means of detecting the unlawful selling of intoxicating liquors by collusion among the three parties primarily interested, the consumer completing the triangular arrangement; but while the disreputable doctor and druggist may be punished by this provision of the law, others may utilize it as a shield and a defense. That all prescriptions should be carefully filed and in such manner as will insure them from damage while rendering them readily accessible, druggists generally are agreed ; but the thoughtful care exercised in this important branch of the business is not uniform.

It is not the purpose of this paper to discuss methods.

By the wording of the section of the Missouri Pharmacy Law quoted. the druggist is directed to file the prescription handed him to be compounded. This means the *original,* not a *copy,* yet the primary object of this section was not to decide who, in the State of Missouri, shall be considered the legal owner of this interesting scrap of paper.

The command to the druggist, in the words of the law, leaves no doubt as to the proper custodian of the prescription, and as a logical deduction, decides the ownership. The model law which this association hopes ultimately to frame, might appropriately contain such a section.

Druggists may be made defendants in damage suits. For a successful defence, if the fact to be established is the correct compounding of a prescription, the presentation in evidence of the original is quite essential. The question as to the ownership of the prescription is an old one, but so long as it is an open and vital one the discussion is in order.

A decision by one of the higher courts would be welcome. The inferior courts in passing upon it have contradicted one another.

No final decision is possible until there shall be a law for interpretation. Each State is at the mercy of its law-makers. For a set of men in convention assembled to agree that certain matters should be controlled by law is simple enough. To secure the enactment of such a law by a State legislature is usually a very different matter. Legislation asked for by druggists is often regarded with suspicion. It is thought to be for the benefit of a class, the general welfare character of it not being usually recognized. After all of our gratuitous service to the public, our altruism may still be doubted.

It is a mistake to suppose that all of the ills of which we complain can be remedied by legislation, but this thought need not deter us from effort in what we conceive to be the direction of improvement. It ought not to be difficult to convince physicians and patients that druggists are the proper custodians of prescriptions ; but what stand shall the druggist take if there be no law behind which he can retreat? It is not unusual for a customer to say : " Please return that prescription with the medicine. You may make and keep a copy of it if you wish to do so."

The druggist complies and takes his chances on any future complications. To do otherwise would be to invite a contention which a politic business man studies to avoid. The practice of requesting copies of prescriptions, the originals remaining in the possession of the druggist, is a growing one. From his standpoint the practice of refilling prescriptions, unless so authorized by the physician, must be considered in this connection. If we concede it to be the patient's privilege to demand and receive a copy of a prescription prepared for him, then it is not possible for the physician to control the matter of its repetition, unless there be an understanding on this point at the time it is written. The druggist, if requested by the doctor not to give a copy of a prescription, will certainly see that his wishes are respected. It is the duty of the druggist, furthermore, to firmly decline to give a copy of a prescription except upon the request of the physician, if it should contain morphine, cocaine, or any other potent and dangerous drug. By the exercise of tact and politeness, he can prevent the precipitation of an unpleasant scene. With these exceptions the patient is likely to receive a copy of his prescription when he asks for it, and he is at liberty to carry it from store to store and get "bids" on the cost of compounding it. Physicians very properly object to the frequent repetition of their prescriptions without consultation with them, but yet an illiberal policy on their part is apt to estrange patients, and result in damage to their practice in the end. The doctor, above all others, must be a man of good judgment. He usually is politic, discreet and tactful.

Evil consequences do undoubtedly often follow indiscriminate self-medication. By a mutual understanding between the two professions, either with or without legal enactments, physician, pharmacist and patient would all be benefited.

SIMPLIFIED ORTHOGRAPHY.

BY SEWARD W. WILLIAMS.

QUERY: "Should the American Association for the Advancement of Science rules for the spelling and pronunciation of chemical terms be adopted by the U. S. Pharmacopœia of 1900?"

In explaining why the new spelling was not introduced in 1890, the Committee of Revision says:

> "While some of the members, individually, were willing to approve and adopt at least some of these new spellings in their professional writings, the decision, so far as the Pharmacopœia is concerned, was almost unanimously against their adoption at this time, it being deemed unsafe and unnecessary to inaugurate such radical changes, not yet generally accepted or followed in practice, in the names of medicines familiar, under their present garb, to so large a proportion of the population."

The Pharmacopœia is forced by expediency to occupy a very peculiar position. A safe conservatism compels it to recognize in its titles existing usage in orthography and nomenclature to a degree which often sacrifices scientific accuracy and uniformity. The book follows professional custom to avoid dangerous confusion and, in turn, the profession follows the Pharmacopœia as its standard authority. It is therefore difficult to tell which is leading and which following. The Pharmacopœia records the survival of the fittest among remedial agents under titles familiar to the profession.

Practical considerations naturally govern official titles, whereas the descriptive portion of the work is thoroughly scientific.

In introducing articles which represent a new class of official remedies, it is highly desirable that future usage be anticipated so far as practicable. Thus the Pharmacopœia may adopt one member of a large class under the title in most common use at the time. During the next ten years a great many other members of the same class may come into general use in medicine. Manufacturers will naturally label all of these to accord with the single official representative of the class, notwithstanding that it may have been conclusively proven that the name adopted by the Pharmacopœia actually belongs to a different compound belonging to a different class. The ultimate result will be a worse confusion than that which it was intended to avoid. Millions of labels and price-lists will be destroyed or changed when the matter is finally righted, and the now deeply-rooted custom of prescribers will have to be contended with for many years to come. The titles for the hydracid salts of the alkaloids from 1870 to 1890, and the numerous labels based upon the established precedents, illustrate this point.

There are certain instances where the name belonging to one thing has been so long employed by physicians for another that it is doubtful if usage can be altered for a century to come. In fact neither the United States nor British Committees of Revision have considered it expedient to change some of these old names. The New British Pharmacopœia still continues Prunus virginiana as the name for Prunus serotina. Individual cases of this kind are, however, of little importance compared with those influencing names of a large and rapidly growing class. When, in the judgment of the Committee of Revision, it is unsafe to make a change in orthography, the writer is inclined to accept the decision, without question, as a wise one. In all cases, however, where safety is not involved, it would seem desirable that the present usage of science, which, in all probability, will eventually become the usage of medicine and pharmacy, should be officially recognized at the earliest possible moment.

In reforms, the transition period is a trying one. If after careful study it is decided that the new spelling has enough force behind it to insure its permanence, it seems not unreasonable that the Pharmacopœia should adopt it, in so far as can be done without causing dangerous confusion. In view of the fact that the Pharmacopœia is our recognized authority and that manufacturers will not hesitate to label their preparations incorrectly or unscientifically if necessary to accord with it, it may naturally be argued that our pharmaceutical guide-book should follow only where it is dangerous to lead. Unless conditions of safety against mistakes forbid, it is certainly better that the Pharmacopœia should be active rather than passive in the matter of orthography and nomenclature—that it should mould usage, instead of being moulded by it.

The question of convenience perhaps presents greater difficulties in debating the adoption of the new spelling than does that of safety. Where safety is involved we, as pharmacists, agree at once to take no chances. In considering convenience, however, we may differ among ourselves, as well as with the prescriber. Suppose, for instance, that what we have known as anethol should be made official. The A. A. A. S. rules, which we are considering, require us to name this methyl allyl-phenol. Anethol would doubtless be given at least as a synonym title, and it is doubtful if the prescribers would ever take the trouble to write the longer name. Glycerin and resorcin, according to the new rules requiring the "ol" termination for alcohols, would have to be glycerol and resorcinol. Physicians will probably take less kindly to long terms, designed for class distinction or scientific preciseness, than to alterations which merely simplify orthography, and thus save them time and trouble. In some cases, as for example quinol for hydroquinone, both objects may be accomplished to everybody's satisfaction.

Fortunately the most marked changes do not affect official chemicals. As pharmacists we are not particularly interested in changes like that from phosphoretted hydrogen to phosphin. If we were, we might argue that confusion might result, because the name already belongs to an aniline dye. The action of the A. A. A. S. in retaining the longer spelling "gramme," despite the objections of phonetic reformers, will doubtless meet with the approval of practical pharmacists. The "me," while of no use at the end of a word like programme, is useful in preventing confusion, so long as the grain remains in use. It ought not to be possible for a fly-speck to divide a gram by fifteen, nor for ordinary copy to mislead the compositor in distinguishing between grain and gram.

It would simplify matters if the English and American chemical societies should adopt the new spelling proposed by the A. A. A. S. These societies are not yet in accord on all the points at issue. Take, for instance, the word anisol, which the rules under consideration change to methyl-phenate. If there were a conflict between the English and American chemical societies, on one hand, and the American Association for the Advancement of Science and several new dictionaries, on the other, agreement might be long delayed. The latter organization is fortunate in enlisting powerful influences which are doing much toward incorporating many of its new spellings as a part of the English language. Indeed, some enthusiast might recast our query to read: "Shall the Pharmacopœia of 1900 adopt the English language of the future?" This, however, is perhaps too previous.

The Pharmacopœia states that "in the choice of titles of official articles it is recommended that convenience, established custom and considerations of safety against mistakes, through similarity or changes in names, should outweigh purely theoretical consideration or scientific preciseness."

The proposed dropping of the final "e" in names of the alkaloids not only obliterates a useful distinction between basic and other organic principles, but may cause confusion of the changed names with those of certain resinoids or concentrations of eclectic medicine which differ from the names of corresponding alkaloids by just this final "e." The majority of the other changes recommended by the A. A. A. S., which interest us as pharmacists; for example, bromin, bromid, sulfate, sulfid, etc., would give rise to little or no confusion, and therefore, as being both convenient and safe, would seem eligible for admission to the Pharmacopœia.

The objects of the A. A. A. S. rules are "essentially the attainment of uniformity in the orthography and pronunciation of the terms used" in chemical science. Incidentally the changes are largely along the line of phonetic reform, and have therefore been accepted by organizations working in this direction. If we accept certain of the more recent dictionaries as authority we may regard many of the new spellings as already a part of the English language. However, in so far as public safety may demand it, pharmacy may properly claim a right to a language of its own. New forms in spelling and nomenclature should give the best evidence of ultimate permanence before knocking at the door of the Pharmacopœia. If we look back to Chaucer's time, we will find that the language has been undergoing constant change, until the orthography of that period differs as much from that of the present, as may the phonetic spellings of the future.

As to change in pronunciation, this is of special interest to professors of pharmacy. The prescriber and dispenser deal mainly with the written language. The altered pronunciation quite naturally follows the changes in spelling, although it may seem to some that there need be no more difference between *id* and *ide* than between *ol* and *ole*. To infuse a little more practicality into the discussion it may be said that in ordering drugs over a telephone the new pronunciation of sulfid might avoid a possible confusion with sulfite.

The writer is free to say that, from a pharmaceutical standpoint, he takes little interest in the new spellings; but, considering the action of the A. A. A. S. as virtually a part of the larger movement to simplify the English language, he is much interested as a plain citizen.

It is thought by some that, having attained liberty and unity, the nation is now entering upon an era of diffusion which shall carry our language to the uttermost parts of the earth. Indications were never stronger than now that English will eventually become the language of the world. These questions come to us citizens: Will not simplifying our language hasten the day? Are we not willing to inconvenience ourselves in the interests of our children and the spread of our language? If so, as professional men, we should think twice before refusing to co-operate and accept in our own field that portion of the proposed change which comes within its scope, in so far as we can do so without causing dangerous confusion.

Dr. C. F. Taylor says in the course of an editorial in "The Medical World," on "Shall we help to free ourselves and future generations from useless burdens in our orthography?"

> * * * "If our spelling were rationalized, millions of dollars would be saved each year in the cost of literature. But much more important than that is the time wasted in learning our irregular, unsystematic and unreasonable spelling. It is a task that begins with our first day at school and ends only with death. As regards the stress which is laid upon verbal memory in school, the English speaking nations stand next to China. We have a few rules for spelling, but every rule is violated by about as many exceptions. All is irregularity, and the poor school children have to learn the spelling and pronunciation of each word individually, some letters having different sounds in different places, and the silent letters having no sound at all. This heterogeneous mass of irregularities and contradictions is an injury to the child's mind. Consistency, uniformity, regularity and constancy are nature's ways, therefore the ways of science. We doctors like to be scientific, but our spelling is most outrageously unscientific. We, of all others, should favor and aid in putting it upon a reasonable and scientific basis. It cannot be done all at once, but we should favor an advance movement, and adopt the recommendations of learned societies that have given this subject careful and conscientious study.
>
> "The leading objection to rational spelling is that the old forms carry with them the etymological derivations. These are very uncertain at best; but even granting all that is claimed for this, it is not nature's way. A tadpole drops his tail when he has done with it. A butterfly leaves the shell of its chrysalis when it takes its flight. Nature does not carry useless burdens; why should we?"

The doctor says suppose a conservative should "propose gough for go ! What would we think of it? Yet it would be just as reasonable as though * for tho." It is needless to multiply illustrations.

Dr. George M. Gould states in his Medical Dictionary that he has endeavored "as regards orthography to do what Prof. Whitney, in the preface of his great work, the Century Dictionary, says is the duty of the dictionary maker: 'The language is struggling toward a more consistent and phonetic spelling, and it is proper in disputed and doubtful cases to cast the influence of the dictionary in favor of this movement.' * * * Gradual, careful phonetic progress is a duty we all owe to our profession."

"In the spelling of certain chemic words," says Dr. Gould, "the advice of the A. A. A. S. has, as a rule, been followed, and seems to be in the line of cautious and wise progress. The unanimous acceptance and practice of all these recommendations by the American Medical Editors' Association constitutes a gratifying proof of progressiveness and freedom from irrational prejudice."

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* Graham, in his Introduction to Phonography and Phonotypy, says: "The couplet

"'*Though* the *tough cough* and *hiccough plough* me *through*,
O'er life's dark *lough* my course I will pursue,'

presents the combination *ough* with seven different sounds. It has another sound in the word bought. If a uniform pronunciation were given to the termination 'ough' in each word, the first line of the above couplet would read in some of the following different ways:

"(Though) Tho the to co and hicco plo me thro.
"(Tough) Thuf the tuf cuf and hiccuf pluf me thruf.
"(Cough) Thof the tof cof and hiccof plof me throf.
"(Hiccough) Thup the tup cup and hiccup plup me thrup.
"(Plough) Thow the tow cow and hiccow plow me throw.
"(Through) Thoo the too coo and hiccoo ploo me throo."

Having noticed that a number of the most carefully edited medical journals were paying no attention to the rules referred to, inquiry was made in regard to the matter, which brought out the following reply from the editor of a prominent New York medical journal:

> * * * "I am utterly opposed to the peculiar spelling advocated by my good friend, Dr. Gould. As for the Association of American Medical Editors, so far as I know it does nothing but hold a banquet once a year. It has occasionally given out that it was going to do something more, but nothing has ever come of it to the best of my knowledge and belief. If it has ever taken action on the subject of spelling I am not aware of the fact, and most certainly I should not hold myself bound by such action."

In reviewing the New British Pharmacopœia, one of our ablest American Pharmaceutical authorities, a gentleman whose influence is great and whose reputation is world-wide, says: "In nomenclature, it is a source of satisfaction that none of the so-called phonetic reformers have made any headway in the chemical names in Great Britain. We do not find 'fosforus,' 'sulfid,' 'bromin' or similar excrescences in the book." This is a conspicuous "straw indicating which way the wind is blowing" among authorities influencing the course of the Pharmacopœia.

Foster's Encyclopædic Medical Directory retains the old spelling, as does Lippincott's Medical Dictionary. On the other hand the Orthographic Union says, in regard to chemical terms: "Spell, in general, according to the recommendations of the American Association for the Advancement of Science, adopted in 'A Standard Dictionary,' and largely in 'The Century Dictionary.'" The new spellings have been adopted, according to the Orthographic Union, in the following publications: Agricultural Chemistry, Wiley; Buffalo Medical and Surgical Journal; Chemical Analysis, Caldwell; Journal of Analytical and Applied Chemistry, Hart; Laboratory Exercises in Chemistry, Bartlett; Medical News; Qualitative Analysis, Beilstein—Ed. Curtman; Reactions, Flückiger's, Ed. Nagelvoort; Science, New York; Systematic Mineralogy, T. Sterry Hunt, etc.

The Standard Dictionary states that "weight has been accorded the phonetic canon, write as you speak," and mentions two of the best chemical authorities in the country as endorsing its adoption of the A. A. A. S. rules for spelling chemical terms.

Among the pharmaceutical journals, the one first adopting the new rules wisely made an exception in retaining the final "e" for alkaloids. Another adopted the rules in its educational section only. Some are waiting the action of the Pharmacopœia before paying any attention to the matter, while one prominent pharmaceutical journal and one important medical periodical strongly oppose the new spelling. Some dealers in chemicals have adopted the new rules, as evidenced by their price-lists. In fact there is a lack of agreement all along the line which looks to confusion.

It is a significant fact that the English and American chemical societies have not yet adopted the new spelling, although it may be said that certain of the new terminations, for instance "ol" for alcohols, are in accord with older rules of these societies. The journals of the English and American Chemical Societies continue the same orthography as before the rules of the A. A. A. S. were formulated. The editor of the journal of the American Chemical Society, although a member of the committee drafting the rules, says he has not thought it wise to adopt the new spelling in that journal as yet. The chemical journals are naturally expected to lead the pharmacopœias in changes of the kind considered.

Authors of chemical and medical text-books will doubtless largely adopt the new spelling, as many already have done, and the influence of these works will naturally be reflected in the usage of graduates from high schools, scientific institutions, medical colleges and universities generally. Pharmaceutical graduates will be more largely influenced by the Pharmacopœia. The question is: Shall that work differ from the rest, except where conservative deviation is required to avoid a more dangerous confusion?

Among the agencies working for simplified orthography not already mentioned are the Philological Society of England, the American Philological Association, the Modern Language Association and the Royal Geographical Society.

It may properly be observed here that if we are to be hampered with etymological entanglements we shall not be able to go far in the direction of phonetic spelling. Fosfate ought to be as good a word as sulfate, but etymology bars the way. James Russell Lowell is quoted as saying: "There is nothing more dangerously fascinating than etymologies. * * * The pedigree of an adjective or substantive is of little consequence to ninety-nine men in a hundred. * * * The important question is, what does the word mean now?"

Is our attachment for the old in orthography greater than it once was for the old systems of weights and measures? Who is there among us who will not feel like joining in celebrating the centennial of the metric system next summer? The "Mouvement Geographique" of Brussels says: "In one hundred years the metric system has conquered the world." Might not something similar be said sometime in the near future of the English language, if it were simplified as it might be, were we willing to sacrifice sentimental considerations and an unreasonable conservatism?

Many may argue that the English language is all right as it is, that its irregularities and redundancies afford valuable mental discipline, and that the proposed rationalization is revolutionary and a needless sacrilege. Selfishly speaking, our own peace and comfort favor conservatism. We have been initiated, and it's amusing to see the rising generation "ride the goat" that gave us such a shaking up. Obviously the question before us is not one of choice, but of obligation to posterity. The object of this paper is to present both sides in an unprejudiced way, merely urging the Association to a thoughtful consideration of its duty in the matter under discussion, regardless of personal preference.

Pharmacopœias are usually not pioneers in orthographical changes, for reasons already given. It is when altered words have come into general use that they are, as a rule, adopted by the pharmacopœias. If the American Pharmaceutical Association believes the new rules should be adopted, the surest course is to favor their general use in medicine and pharmacy, that they may at the earliest date become eligible for admission into the Pharmacopœia. A resolution favoring the new spelling and recommending its adoption, would perhaps influence the colleges of pharmacy and the pharmaceutical press to an extent that would insure a sufficiently general use by 1900, to warrant the recognition of the new spellings by the Committee of Revision at that date.

REPORT ON PRELIMINARY EDUCATION REQUIREMENT.

BY J. H. BEAL.

On May 4th, 1898, a copy of the following letter was sent to the President and Secretary of each State Pharmaceutical Association, to the President of each Pharmacy Board, and to the Secretary of each College of Pharmacy, in the United States and Canada.

Dear Sir: At the annual meeting of the American Pharmaceutical Association held in Montreal, in 1896, the following resolution was adopted:

"*Resolved*, That the subject of preliminary education be presented by the Section on Education and Legislation to the various State Pharmaceutical Associations for consideration, and report to this Section at the next annual meeting.

In pursuance of this resolution, a circular was prepared by the officers of this Section and submitted to the various State Associations during the summer of 1897, but only a few responses were received.

In view of the importance of a general agreement upon the preliminary education which should be required from candidates for license as pharmacists or assistant pharmacists, it is highly desirable that a general expression of opinion should be had from all State and other Pharmaceutical Associations. The report should embrace the following questions:

(1) What should be the minimum of *general education* to be required of candidates for examination and registration as pharmacists and assistant pharmacists?

(2) Should the standard be lower for licentiates who expect to practice in country towns than for those practicing in the larger towns and cities?

(3) To what extent would it be practicable for Boards of Pharmacy to enforce these requirements under existing laws, and in view of the present conditions of the practice of pharmacy?

(4) Would it be advisable to attempt to put the plan into immediate operation, or to select some time in the future at which it should be generally adopted and carried out? If advisable to defer it to some future date, what time would you suggest?

It is hoped that you will kindly bring this matter to the attention of your Association at its next meeting, or to the Board of Pharmacy or college with which you are connected, and request the immediate appointment of a committee to take the matter into consideration, and report upon the same to the undersigned at the earliest possible date.

Trusting that you will give the subject your careful attention, I remain,

Very truly yours, J. H. BEAL.

The replies received were few and far between. A number of the parties to whom the letter was addressed gave notice of its receipt, and stated that they would bring it to the attention of the association, college, or board with which they were connected, and report at a later date. Up to the present time, however, these replies have not been received.

Only two state associations seem to have given the matter any consideration, the Michigan and Minnesota Associations. Their answers are as follows:

MICHIGAN.

1. A fair, ordinary "Grammar School" education, or the requirement of good, fair English writing and the use of arithmetic as required in pharmacy.

2. No.

3. We believe that, in most states, Boards of Pharmacy could safely subject applicants to a preliminary examination in English writing and arithmetic. Where this is not expedient, the applicant who fails in the entire examination because of his inability in English or in arithmetic should be distinctly informed of this cause of his failure.

4. Into immediate effect as defined above.

A. B. PRESCOTT,
OTTMAR EBERBACH,
A. C. SCHUMACHER,
Committee.

MINNESOTA.

1. That it is the opinion and sentiment of the Minnesota State Pharmaceutical Association that the minimum, general, or academic education to be required of candidates for examination and registration as pharmacists and assistant pharmacists should be a complete high school education, as given in the high schools of the first grade in Minnesota, or an equivalent; and,

2. That the standard should not be lower for licentiates who expect to practice in country towns than for those practicing in larger towns and cities; and,

3. That the plan be put into operation as speedily as possible or expedient.

PROF. F. J. WULLING,
Chairman of Committee.

No report was received from any Board of Pharmacy.

From Prof. George F. Payne was received the following:

Answer 1. A good common school education.

Answer 2. We do not see how it would be practicable or fair to have two grades of license. Certainly the welfare of the people in the country is as important as that of the larger towns. Yet it might be practical, however, to establish the two grades of druggist and pharmacist and permit those who secure pharmacist's license to practice anywhere, and permit those who can only reach the grade of druggist to only carry on the drug business in those small towns where the population is principally served by the physicians dispensing most of their own prescriptions, and hence the prescription business of such drug stores would be very small indeed, and of a simple character. I am not wedded to either plan, but am simply afraid that grades for different sized towns would bring about a great deal of confusion. Suppose a man gets the grade as druggist and practices in a town of 100 people, suppose the town grows rapidly, like some have done in this State recently and the number reaches 500, such men in such a case would be really enjoying privileges to which they were not entitled.

Answer 3. We believe that it would be practical for most Boards of Pharmacy to enforce any just requirements under existing conditions where they are not in direct conflict with the law.

Answer 4. It would be advisable to formulate some fair plan and select a definite date in the future, say two years from now, at which it would be put in operation as far as possible. This would give the various States who wish to secure legislation to assist them in the matter, an opportunity to do so. GEORGE F. PAYNE.

From his reply it is evident that Prof. Payne understood query No. 2 to refer to the pharmaceutical training of the candidate instead of his general education.

The following reply was received from Louis Emanuel, President of the Pennsylvania State Examining Board:

I am personally not in sympathy with the purport of the circular on education. I am of the opinion that if an applicant has enough learning in "readin, writin, spellin and figgerin," with enough *common sense* to put what little learning he has to practical use, he will make a competent pharmacist. I have known applicants who were high school graduates that could not put the principles of mathematics to a practical application.

LOUIS EMANUEL.

From E. C. Bent, Secretary of the South Dakota Board of Pharmacy, was received the following:

Personally, I hold to the view that nothing less than a high school education should be required. E. C. BENT,

Secretary of Board and Association.

Four colleges replied through their accredited representatives as follows:

MONTREAL COLLEGE OF PHARMACY.

Preliminary Examination for "Certified Apprentices."

The candidate will be required to have a thorough knowledge of the different parts of speech of the English language, write ten lines from dictation, and parse correctly one sentence. If French, the candidate will not be required to parse, nor will he be required to have an extended knowledge of the English parts of speech, but to have a thorough knowledge of the different parts of speech of the French language, write ten lines from dictation, and parse one sentence correctly. If English, the candidate will not be required to parse, nor will he be required to have an extended acquaintance with the French parts of speech.

To give one noun in each declension, also one verb in each conjugation of the Latin language. To translate ten lines taken from the first book of Cæsar.

To have a general knowledge of the theory and practice of arithmetic.

To be familiar with the geography of the world.

To be familiar with the leading points in the histories of Canada, United States, England and France. E. MUIR, *Secretary*.

The preceding are the requirements for the Montreal College of Pharmacy.

ALBANY COLLEGE OF PHARMACY.

Resolved, While we do not consider the questions in circular letter of Chairman of Committee on Education and Legislation of American Pharmaceutical Association as directly concerning a college of pharmacy, we heartily endorse any movement for the better education of pharmacists. The answers to the questions are therefore simply expressions of opinion.

To Question 1, we answer that the minimum of general education required should be the completion of the courses in the common or grammar schools. It is especially important that a thorough comprehension of arithmetic with reference to fractions, vulgar and decimal, and proportion, should be demanded.

Question 2. We believe that the standard should be the same for all localities.

Question 3. We believe this should be enforced in the section of the State covered by the present State law.

Question 4. We believe it would be best to select a future time for its application, and suggest one year. DE BAUN VAN AKEN,

Secretary.

UNIVERSITY OF KANSAS DEPARTMENT OF PHARMACY.

1. Graduation from 8th grade common school. Equal to admission to high school.
2. NO!!!
3. An easy matter for State Boards to require it.
4. At once. L. E. SAYRE.

PURDUE UNIVERSITY.

Having no Pharmacy Law in Indiana, these questions have not pressed themselves upon us. Consequently, I have no *well-founded* answers. ARTHUR L. GREEN.

CINCINNATI COLLEGE OF PHARMACY.

Since the New Orleans meeting of the American Pharmaceutical Association I have lost all faith in the united action by the teaching institutions of pharmacy, and as long as this is wanting nothing will be accomplished and all is a waste of energy. The continued cry is for higher education, and yet the foundation upon which mental development is expected is continually ignored. Is it not ridiculous to teach the higher branches of pharmacy upon a mental qualification equivalent to that demanded by admission to a high school? Is it not absurd to face the fact that one institution teaches book-keeping and business methods in its *third year* course; another requires elementary mathematics, common fractions, decimals, percentage, etc., as an essential factor to obtain a degree? Education of this nature should be prerequisite to admission. With the exception of one institution, every college of pharmacy in the old cordon of teaching colleges is dependent upon the revenues derived from students, and consequently they watch each other so closely lest some student might get away, that the bars are thrown down at the expense of the calling.

But why need I dwell upon matters perfectly familiar to you, and which cannot be remedied unless a cordon of teaching colleges is formed in which each institution is bound by an iron-clad contract? Then you may expect to elevate pharmacy, and I trust that the time is at hand.

Regarding the standard for licentiates in small towns being lower, is in my judgment simply absurd. The responsibilities remain the same under all conditions, whether they be in a country town or a cosmopolitan city. Everybody should come under like restrictions, and the enforcement of the restrictions should be vested in boards of pharmacy by law.

C. T. P. FENNEL.

SCIO COLLEGE DEPARTMENT OF PHARMACY.

1. High School Graduates.
2. The standard of preliminary education should be the same for licentiates in small as in large towns.
3. The Boards under present laws have ample authority to exact such an education from applicants for license.
4. It would be advisable in our opinion for the Boards to set a date some years in advance at which the requirement would go into effect.

From the above it will be seen that neither the state associations nor the Board of Pharmacy are induced at this time to take any active steps looking toward the better general training of those who are entering upon the study of pharmacy.

PHARMACEUTICAL REORGANIZATION ON THE BASIS OF THE CONGRESSIONAL DISTRICT.

BY EDWARD KREMERS.

A few years ago an American writer on pharmaceutical legislation called attention to the fact that, shortly after the reorganization of the German Empire, the pharmaceutical laws of the various states, provinces and petty dukedoms were remodeled so as to be a credit to the new empire. At the same time it was pointed out that the enormous expanse of our country, with its various stages of civilization, made it about as difficult for one state to organize as it was for all the German states and provinces taken together. Nationally uniform legislation would, therefore, seem out of the question, at least for a long time to come. However, it does not appear to have occurred to any one to suggest the reorganization of the pharmaceutical state on a basis which all of the states of the Union have in common, viz., on that of the Congressional district, and thus take the first step toward national uniformity.

It has been the common complaint of the presidents of our State Associations that not more than thirty or in some cases not more than ten per cent. of the druggists of the respective states are members of their state organizations. Although the attendance at the annual meetings is largely increased by the presence of numerous ladies and a host of traveling men, many State Association meetings are held with not more than two or three per cent. of the pharmaceutical practitioners of the state in attendance. Yet frequently matters of great importance are brought up at these meetings, in which all pharmacists should have a voice. Furthermore, an annual meeting which assumes more or less the nature of an outing is totally insufficient to keep alive the interest in the organization, especially in a large state where the distance to the place of meeting may for several years in succession be so great as to exclude a very large percentage of the druggists from attending, for financial reasons. After several years of inertia it is difficult to rouse the former interest.

From the State Board point of view, the State is also too large as the only unit. Representation on the Board, for various reasons, must be geographical. Though for examination purposes, five meetings of the State Board, with an average majority attendance, may be considered too frequent, for the purpose of inspection the number of members, and the time given to official activity by these few members is totally inadequate.

The congressional district as the smaller unit for the reorganization of the pharmaceutical state is suggested (1) because it is the unit of population throughout the United States; (2) Because with the number of congressional districts in a given State, the number of local pharmaceutical organizations and of officials will vary with the population of a State, and consequently with the number of pharmacies and the amount of work to be done.

In order to illustrate how such reorganization would affect the pharmaceutical state, permit me briefly to indicate the change it would bring about (1) in our State Associations, and (2) in our State Boards.

The pharmacists of each district should unite to local associations, at the meetings of which not only local business matters, but also technical papers should be presented and discussed. It would also be well not to overlook the possible social features of such an organization.

The State Association should be of the nature of a congress of delegates from each district association, as well as other pharmaceutical organizations of the State, such as the State Board and the incorporated colleges or schools of pharmacy. All pharmacists, as well as other persons interested in pharmacy, should be welcomed as guests, and might be accorded the privilege of the floor, but should not be permitted to vote.

Several months before the annual meeting, the council should submit a list of subjects to be discussed at the annual meeting to each district association, so that the local associations may have due time for discussion, and can instruct their delegates how to vote. Whenever feasible, the council should submit a "Referat" (a short critical discussion), one *pro* the other *con*, on questions of great importance involving study and investigation.

Questions to be discussed at the state meetings should be general and of a professional, ethical or commercial nature. Science should not be represented by papers of a technical nature, but by one or more general addresses or lectures, with a discussion of the subject thus introduced. More specific subjects of a scientific or technical nature should be left to the local associations during the fall and winter months. The annual meeting should be of the nature of a general conference with appropriate social features.

In order to avoid too great decentralization, the state and district meetings might be supplemented by meetings of sections, two or four, particularly in the larger states. Furthermore, when a single city comprises several districts, the interests of the city as a unit will be preserved. A calendar of meetings for a state like Wisconsin might be extemporized as follows:

August—Annual meeting.
September
October } District meetings.
November—Meetings of the four sections.
December
January } District meetings.
February—Meetings of northern and southern Wisconsin.
March
April } District meetings.
May—Meetings of four sections.
June
July } District meetings.

The State Board of states with scant population should consist of a representative from each district appointed by the Governor upon recommendation of the pharmacists of his district, and of one or several members representing the state at large, in the appointment of which the Governor might be given more freedom. This would give a majority appointed according to the wishes of the druggists, but would prevent absolute control of important interests of the people by one calling. In states with denser population, several districts might be grouped so as to prevent the formation of State Boards too large and unwieldy for effective work.

Each district or group of districts should have a local board of which the representative on the State Board should act as chairman. The district boards should be given control over all local matters, registration of apprentices or graduates serving their time of probation, examination of assistants, inspection of drug stores, etc. Whereas now new members of the State Board are recruited from what might be termed raw material, these local boards would serve as training schools for the State Board. The latter would exercise a general control over the local boards and receive unity and uniformity of action through its members, who, as stated before, should be chairmen of the local boards.

If the work of the State Board is properly distributed to committees whose members possess special qualifications to do the work assigned to them, it would not be necessary for the State Board to meet oftener than once or twice each year. The salaried secretary of the State Board should be *ex officio* secretary of the various committees. He should also be expected to attend at least one of the district meetings annually. He would thus become thoroughly instructed in the doings all over the State, and could carry information wherever desired. By a careful distribution of labor among the committees of the State Boards and the district Boards, an organization of this character would not be much more expensive than the organization now common in the various States, and would be much more effective. Take *e. g.*, one of the principal functions of our State Boards, viz., that of examination of candidates for registration. I fear little contradiction if I venture to claim that neither the druggists who nominate nor the Governor who appoints thinks much of the qualifications of the respective candidates as examiners. Yet the capacity to conduct examinations properly is not possessed by all pharmacists competent to carry on their business, neither is it acquired by intuition. Lest I be misunderstood, permit me to state that it goes without saying, that the assistant examinations conducted by the local boards should be conducted according to a uniform standard adopted by the State Board. Any one who has studied the nature of our State Board examinations and the geographical distribution of the candidates will, I think, agree that one or two thorough examinations for the first grade certificate are sufficient each year, and that much time can be saved if candidates for the second grade certificate are compelled to take their examinations nearer home.

One important duty of our State Boards, that of securing for the medical profession and the sick public a proper supply of pure medicines, is at present not exercised at all. The proper inspection of the drug market and of the stores themselves is out of the question with our State Boards as at present constituted. The fact is, that our State Boards have been found so utterly wanting in this respect that one State after another is taking this matter largely out of the hands of the pharmaceutical profession, and turning it over to food and dairy commissioners. Of the results that have already followed in several States I need not speak.

At first sight, the suggestions made in this paper may be considered revolutionary in character. Upon a moment's reflection, however, I am confident that they will appear in their true light, viz , evolutional. The unit suggested is not only the lesser political unit of our national institutions, but in a number of States it is at present used for similar purposes of representation, as suggested. The governing bodies of our State universities, *e. g.*, which rank among the best governed public institutions in the country, are, in many instances, organized upon the congressional unit with proper representation for the State at large. As to the sectional organizations, it is but necessary to refer to the corresponding medical societies of numerous States at which much of the most effective work of our medical colleagues is said to be accomplished. With regard to the annual meetings as a conference of delegates from the various district organizations, your attention may be directed to England, Germany and other European countries which have effective organizations of this character working hand in hand with district organizations, and thus securing expressions of opinion from the profession at large rather than from a few persons, representing very largely a single nation only, in which the annual meeting happens to be held.

All of these suggestions might be worked out with more or less detail, yet such details would detract rather than add at present to that which is germane. Some of the most perplexing problems that confront pharmacy in general, and our State Boards in particular, might be solved by a single bold act. The salvation of American pharmacy lies largely in the better education of its practitioners; however, it is also in need of a more effective organization. The two will have to go hand in hand to produce the best results.

Everywhere, be it for good or bad, people are perfecting their organization. We do not want a powerful guild, that will dictate to the legislature, any more than we want to see our government unduly influenced by any class. We need, however, a perfected organization which, with its greater unity and usefulness, will stimulate an *esprit de corps* that makes for higher ideals.

POISON: ITS LEGAL DEFINITION AND SALE.

F. H. FREERICKS, CINCINNATI, OHIO.

Legislation for pharmacy is at this time receiving general attention from those interested in its advancement, the result of which is evident in several recently enacted or amended pharmacy laws. While these improvements have been limited, as a rule, to requiring better evidence of knowledge and a higher standard of education from applicants for registration, the work of the American Pharmaceutical Association during the last few years indicates how deeply concerned the active and progressive men in pharmacy are regarding its improvement along other lines.

In determining the fitness of applicants desiring to practice pharmacy the authorities are restricted to examinations, either oral, written, or practical, but after the fitness of the licentiate has been established, the next most important function of the law is the regulation of the dispensing and sale of poisons.

The great interest manifested throughout the country in the efforts of your Committee on Legislation has resulted in a general and wide-spread desire to improve upon the poison and label laws.

Clearly and definitely it was proven by the splendidly formulated report of this committee last year that nowhere can there be found a clear and concise definition of the word "poison," positive enough to base a law upon. If it were possible to concisely state what shall constitute a poison, it would be a comparatively easy matter to frame effective laws regulating the sale of such substances.

But since it is impossible, or at least impracticable, to place upon the word "poison" a construction sufficiently broad to be used without hardship and sufficiently limited to be safe, it is evident that if the life and health of the public are not to be grossly endangered, a positive and unequivocal definition of what shall constitute a poison must be promulgated from some authoritative source. The question next arising is, who can best assume the authority to give this definition? In the writer's opinion the proper authority for this purpose is the Revision Committee of the United States Pharmacopœia. The definition of this committee would at least be national in character, and its provisions would be binding the country over.

State legislation, however much to be lauded, is insufficient; and efforts in that direction, while no doubt often inaugurated by able pharmacists, are subject to the desires and changes of uninformed members of legislative bodies.

If the United States Pharmacopœia classifies substances to be recognized as poisons, the proper legislation will be within reach in the next few years, as all legislative bodies recognize the Pharmacopœia as an authority safely to be followed. The foundation for a law just and applicable to all will be furnished, and legislatures will be prompt to act in accordance therewith, and finish that for which the Pharmacopœia can offer a basis by defining what shall constitute a poison, with proper laws regulating its sale.

Much has been said for and little against the proposition of the adoption of maximum doses in the next issue of the Pharmacopœia. The opinion now prevails that this will be done, and no doubt such addition will prove of great advantage to physicians and pharmacists alike. If this can be done, why cannot the Pharmacopœia also state what drugs shall be considered as of dangerous character, based upon the maximum doses in which they may be administered? It can be argued that in the past it has been the distinct desire of the Committee of Revision to recognize only such substances as are of sufficient remedial value to deserve space in the Pharmacopœia, and that there are a great many substances of poisonous character which have not been found deserving of such distinction. While this is no doubt true, it must be acknowledged that the committee have no need of precedents in order to add to or omit from its scope of usefulness, and if they deem it proper or necessary to separately or collectively define what shall constitute a poison, it certainly lies within their province to do so, whether all substances coming within that ruling are, or have been, otherwise officially recognized or not.

In order to determine more clearly the sense of the preceding lines and to illustrate the idea set forth therein, a rough classification such as the Pharmacopœia might adopt is appended below.

CLASS A.

Hydrocyanic acid, compounds of antimony, arsenic, mercury (except calomel), silver, cyanide and sulphocyanide, nitrobenzene, oils of tansy, croton, pennyroyal and savin. Phosphides, phosphorus, wood alcohol, cocaine, chloral, apomorphia, aconite, belladonna, cotton root bark, conium, cantharides, cannabis indica, colchicum, digitalis, duboisia, ergot, fish berries, gelsemium, black and white hellebore, hyoscyamus, ignatia, nux vomica, opium, poison oak, pilocarpus, physostigma, strophanthus, stramonium, veratrum viride, elaterium and their active principles.

All other drugs and chemicals the maximum dose of which is one decigram or less, as given in standard works on pharmacy.

CLASS B.

Acids, carbolic, hydrochloric, nitric, nitrohydrochloric, conc. phosphoric, oxalic, picric, sulfuric. Aqua ammoniæ all strengths. Compounds of barium, copper, cobalt, and soluble compounds of lead and zinc. Potassium and sodium hydrates. Bromin, iodin, bitter almonds, creosote, chloroform, ether, essential oils of mustard and bitter almond.

The term compound as applied in Classes A. and B. refers to chemical combinations.

While such an arrangement and definition of all that shall be considered as of poisonous character is not perfect, the writer contends that it is an improvement, and leaves room for severe criticism only in making a dividing line for all such not specifically mentioned as those the maximum doses of which are 0.1 Gm. or less. It must be admitted, as a matter of course, that there are some active principles and synthetic compounds, the dose of which is more than 0.1 Gm., that would possibly be considered as dangerous, but on the other hand these are such that if the limit line would be put at 0.2 or 0.5, some of most harmless nature would be included.

PHARMACEUTICAL EDUCATION, PHARMACY BOARD EXAMINATIONS, AND THE PRESENT AND FUTURE STATE OF PHARMACY.

BY ALFRED B. HUESTED, ALBANY, N. Y.

Pharmaceutical education, pharmacy board examinations, and the present and future status of pharmacy have been and are the subjects of much thought with those interested in these lines of work. Much is also written and said on these subjects, and if we judge correctly the greater part is in favor of higher education, advanced standards of examination, and the rescue and elevation of pharmacy in its practical workings from the slough into which it has fallen.

These thoughtful people and others believe that a change has come over the spirit and essence of pharmacy during the past thirty or forty years, and that while education and knowledge has increased and accumulated, the actual condition of pharmacy in its practical working has not improved, on the contrary a certain amount of degeneration has come. Pharmacy, in its actual working, is so mixed with trade of various kinds as to be almost lost sight of. There is not less education and knowledge than formerly, on the contrary there is more; but the pursuit of pharmacy is so hampered with merchandise which is foreign to medicine and hygiene, and so large a proportion of remedial agents is prepared in laboratories devoted to such lines of work, that the pharmacist has become from necessity to a great extent, and in many cases wholly, a merchant. Unquestionably if he could lop off trade in foreign lines and devote himself to his legitimate work, ideals might be realized and he would be on the high road to the desired goal.

It will not be asserted by any one that theoretical education in schools and colleges is carried too far, or that the standards for admission and graduation are placed too high. The fixing of these standards must, as a rule, be left with each institution, except so far as general state requirements are made.

Examinations by pharmacy boards, being established by law, and for a definite purpose, should accomplish that purpose. These examinations have been the subject of much comment and criticism, the main tenor of which is, that there should be higher standards and different methods of conducting these than obtain in general, while a minority contended that these can be and are made extreme. In fixing this standard and conducting the examination, the purpose for which they are instituted should be considered. The standard should be somewhat in excess of the work, and the method correspond to that which obtains in practice. An ideal examination would be a combination of the theoretical, which should be written and not too extended; the practical, conducted in a laboratory, and consisting of the identification, testing, preparation of medicines and compounding of prescriptions, and a brief catechism in doses and toxicology. The practical part of the examination could very justly include the privilege of consulting standard works on chemistry, pharmacy and materia medica, such as should be found in all pharmacies. The theoretical part should not be carried to the extent which obtains in schools and colleges. Such an examination would occupy more than one day's time, and need not cover two entire days. It could not degenerate to a farce, nor be such as might be passed by memorizing quiz compends. It would necessitate increased expense over present methods, and more than the average receipts of boards would warrant. As a matter of fact, if the reason for the enactment of pharmacy laws is solely for the public good, and the majority held to this, then the expense of applying these laws should be a public one, and not fall on those who administer to the public under them. This has not been the custom, and probably will not be, because governmental administration often brings political considerations and greatly increased expense, but more especially because there would be objections among the majority of pharmacists to allowing the supervision of these things to be taken out of their hands. So long as these things continue, the expense of application and enforcement of the laws must come from the pharmacist.

The advocates of high and rigid standards of examination believe this to be the remedy which is to purge pharmacy of all that is foreign to it, and elevate it to the full dignity of a profession. It is predicted, also, that by this means a separation will or can be made into the simon-pure pharmacist who compounds and handles medicines only, and combines with it other scientific work, as examinations and tests for the physician and the public; the balance of the present pharmacist's work, the preparing and dealing in the less potent medicines, and many or all the other agents now found in pharmacies, being left to the druggist. In making such a division it would be difficult to draw the line between the agents to be handled by the two classes; or if the higher grade were accorded the handling of all the agents called for by the physician, it would not be long before the same condition obtained as now exists. If a line of separation is drawn, it would be impossible to prevent trespassing of the one upon the other.

If a separation into a higher and lower grade is to occur, and there are many who not only think this desirable but believe it probable, will it not rather take the form of an offset from the present pharmacist or physician, or both, and be that of a pharmaceutical and medical chemist, microscopist and bacteriologist, for the physician and the public, leaving the pharmacist where and to a great extent what he is. There is no doubt but circumstances and localities control the stock of medicines and other agents dealt in by pharmacists, and no law or combination of effort would be effective in compelling or prohibiting the sale of agents. This has, in the past, been governed by circumstances, localities, and the general laws of trade, and will probably so continue in the future.

This new departure would be purely scientific in its character, have nothing of the commercial in it, and would not be likely to degenerate. Unquestionably, the law of development in scientific research and knowledge is in the pursuit of single or allied subjects, while the highest development of commerce is in a combination of all lines. This separation will probably be a natural one, rather than the result of law or special effort.

An examination such as we have outlined would commend itself to all fair-minded individuals, because of its justice and adaptation to existing conditions. It could be creditably passed by the college graduate who has had practical experience, also by the studious practical man, but not by the superficial or quiz-compend student or the purely theoretically-educated college man.

It is not my thought to decry education nor say aught against it, but to emphasize the fact that all cannot be Procters, Squibbs or Maischs, and that these men of superior attainments are not those who carry on the retail pharmacist's work, nor do I believe such ever will. The great mass of pharmacists have an average or mean education which is commendable and should be encouraged, which must first be secured as a stepping-stone and stimulus to higher education. It is those possessing these attainments who to-day honorably, yet under difficult conditions, fill over seventy-five per cent. of retail pharmacists' positions. These need commendation and encouragement. The standards of examination by boards should not be placed so much higher than the requirements of the position as to be out of reach and prohibitory, nor so low as to quench effort and bring ridicule.

The question of expense stands in the way of carrying out proper examinations and must be met as the needs and resources of localities allow. That a very general raising and adjusting of the standard is needed, and can be made, is probably apparent to all.

PRACTICAL PHARMACEUTICAL LEGISLATION.

H. G. WEBSTER, MINNEAPOLIS, MINN.

The history of pharmaceutical legislation in this country dates back only about twenty years. At that time the progressive members of our State Associations, realizing the over-crowded condition of the retail drug trade by incompetent persons attracted to it by the traditional pecuniary profits, suggested an attempt to secure the enactment of pharmacy laws as a means to weed out incompetency, or at least to prevent further increase, by requiring certain legal qualifications of those who entered it thereafter. In this way it was hoped to advance the intellectual attainments of the members of the craft and improve the financial condition of those who remained in it. As neither lawyers nor laymen knew much about such legislation, they thought the easiest way would be to copy from such laws as already existed, with the result that they almost invariably copied all the defects and left out all the virtues, if they had any; so these patched-up bills were passed in State after State, and the experiment was commenced. We have been experimenting ever since—with what degree of success, each one is entitled to his own individual opinion; but that progress has been made cannot be denied—facts prove it; but disappointment has come to many an enthusiastic promoter of this sort of legislation, as he noticed the failure to advance the requirements for legislation as rapidly as he thought should be done, or to control the commercial part of the trade as successfully as he had hoped. The former achievement is certain to be accomplished; the latter, probably never.

I can perhaps do no better at this point than to quote the following from my report to our State Association this year:

"Yes, there is progress in pharmacy in Minnesota. It is not so apparent from year to year, but in looking back over the thirteen years during which our pharmacy law has been in force, it is easy to see a marked progress in the science as practiced to-day all over this great State as compared with what it was then. It is safe to say that the profession is in the hands of men of far greater intelligence as regards their profession than ever before. This is shown by the candidates for registration who come before our Board for examination. While the requirements and thoroughness of these examinations have been steadily increased from year to year, the per cent. of those who pass is about the same, showing that the applicants for the honor of registration by examination have succeeded in fulfilling these requirements, and the movement has been steadily upward. * * * * Few persons now attempt the examination without having taken some course of study in pharmacy. At this time there are in the pharmacy schools of this State one hundred students, and it is safe to say that half as many more have been in attendance during the year. This is in addition to those who may be attending outside the State. Compare this with thirteen years ago, when there was absolutely no opportunity to secure a pharmaceutical education in the State, and consequently no students, with the exception of now and then one attending school outside."

In my opinion, this Association can perform no better service for the pharmacists of our country, and the general public as well, than to devote a liberal portion of its time and energy to this subject; but, to make progress, we must study the experiences of the past. The opinions of men who have been active in the promotion of legislation in their several States for years, should be sought; their successes and defeats, with causes, reviewed; and in this way we shall be able to find where the difficulties lay, and avoid the pitfalls of the past. We must remember that we are facing conditions, not theories, and that idealism is to be obtained only after patient and continued efforts.

In drafting a bill for a law, the language should be concise and clear; do not load it down with some cumbersome provisions; leave something to the judgment of the courts and Boards; without good men in these positions you will make a failure anyway. I will not attempt to particularize what the requirements of the law should be, but will close with a brief statement of requirements suggested by my own experience.

All classes of persons should be required to pass an examination with the exception of persons holding certificates of examination from other State Boards, whose methods are approved by the Board to whom application for registration is made. Pharmacists should not be less than twenty-one years of age, and have had four years' practical experience in drug stores; one or two years of this experience should be deducted in the case of graduates from colleges of pharmacy giving a complete course of instruction. This will encourage young men to attend such colleges. Assistants should be not less than eighteen years of age, and have had two years' practical experience. A high school diploma, or its equivalent either in diploma or examination, should be required of all who take the examination for pharmacists. No person should be allowed to take the examination for the certificate of pharmacist until he shall have received the certificate of assistant upon examination by some Board of Pharmacy. Only a part of the examination fee should be refunded to those who fail to pass. Certificate should be renewed annually. A small penalty should be exacted for failure to exhibit certificate in store or notify the Secretary of the Board of removal. Local permits to sell drugs should be granted to physicians in small villages where there are no drug stores. General merchants, in such places, should be permitted to sell common drugs and poisons put up in packages by registered pharmacists; patent medicines and a few of the most common drugs and simple remedies, named specifically in the law, should be sold by anybody anywhere.

The adulteration of drugs and food products should be left to a special commission created by law for this purpose. Such laws will soon be enacted in every state, and appropriations of money from the public treasury made to properly enforce them. There should be a section regulating the sale of poisons, but it should not be too cumbersome. It is very important that suitable provision should be made for the prosecution and conviction of violators, and the enforcement of penalties. I think the prosecution should be able to proceed either civilly or criminally, as it may elect, as both processes have their advantages. In case of failure or neglect of county attorney to prosecute, the Board should be permitted to prosecute by its own attorney.

FINAL EXAMINATIONS.

BY L. E. SAYRE.

Query.—There is a tendency in some educational institutions to eliminate the final examinations, or to make them optional for students who attain a satisfactory average rating throughout the term. Is such a method desirable or applicable to the course of instruction presented by the schools of pharmacy?

The value of examinations may be viewed from at least three different standpoints: Its value to students, to instructors, and to the State.

To the Student.—No one will question, perhaps, the value of examinations as a part of the class-room work. This advantage, in spite of his disavowal, is experienced by the student himself. It is from students, however, much of the opposition comes. The student needs, for his own development, such peculiar help as the examination furnishes. He needs to be brought frequently to a test of his ability, to be brought face to face with a record which he makes himself of his mental strength and capacity. Purely as a mental exercise it is to him of immense value.

To the Instructor.—The value of an examination to the instructor is probably not so great. It is unquestionably some help as a means of verifying his estimate of the student, although he, in many cases, especially in small classes, knows the mental capacity of his pupil pretty thoroughly. Still for the sake of the general good of the class, and for stimulating to work it is an important factor, if properly used. A prominent instructor, in answer to a question relating to this subject, said· "About 25 to 30 per cent. of my students will not work unless they have constantly before them an examination to prepare for." But no one realizes more than the instructor that working for examinations merely tends to develop superficiality, to strengthen the rote-faculties and to weaken the reasoning faculties. Unless he use this excellent means of instruction according to the principles of what is now termed the "science of examination," he trains the student to cleverly skim the subject and engenders an incapacity for original work. A desire to appear to know rather than to know, and a belief in artifices and formulated answers is the bane of the misuse of this department of class-room work. All this the instructor has constantly before him—experience has taught him the actual value of examinations, and he uses them accordingly.

To the State.—To the legal body which stands between the community and the college—to the State, in other words—documentary evidence such as is furnished by examinations is of unquestionable value, as it presents to this body—what may be read between the lines—a certified statement of peculiar value. Without this documentary evidence, over the student's own signature, both the college and the State would place themselves in a peculiar position with reference to the community, exposing themselves unduly to its fault-finding members, and to the same class among the students, who are always ready to bring up the accusation of favoritism.

The value of final examinations.—The final examination has advantages peculiar to itself. What applies to the ordinary recitation, to the quiz and periodical review, applies in some measure also to final examinations.

Final examinations not only serve to separate the drones from the workers, the competent from the incompetent, but they serve as an important safe-guard against the facile and treacherous memory of the student who accomplishes the daily task easily and makes excellent records on recitations, but who does not retain and accumulate, and who so remains unable to command even the essentials of a whole subject. The fact that the final examination confronts the student tends to keep him from forming the habit of this superficial kind of study, and the examination catches those who have such a fatal fault.

But it is the documentary evidence referred to—the certified statement—which more than any other quality characterizes the final examination.

I have yet to see a candidate for college certificate who was not in his own mind satisfied that he should pass, that he had ability enough to merit the honors the college bestowed upon its graduates. But, as we all know, there is almost always a certain number who are very much decieved about their own ability and acquirement. and who in the judgment of their instructors are in no wise competent or qualified. Such students are not satisfied with the instructor's or examiner's estimate, have no conviction of its justice, and need to be confronted with proof. This a final examination gives.

Now, as to those who have a satisfactory rating throughout the year or term, and those who are thorough and conscientious in their work. The final examination is of value to them in that its preparation allows them to grasp the subject as a whole. This of course was impossible before the subject was completed.

Many students, who are in the least inclined to be nervous, find that final examinations are extremely trying to them. as there is a certain excitement that accompanies them. They also find that the work in its preparation—or the result of this work—is only retained long enough to pass the examination. This, of course, might be applied to all students.

In consideration of this latter point some modification might be preferable. One University has a system of reviews which take up the time of a daily recitation or lecture, or may extend through a week, according to the will of the instructor. This system of reviews aims to be as comprehensive as the work required for the preparation of a final examination. The students are not informed beforehand whether they are to be examined or whether they are to go on with the regular recitation or lecture. This, of course, necessitates a thorough preparation constantly, as no student would dare to take the risk of being unprepared for any emergency.

Such a system doubtless can be improved upon, and it is to be hoped that in some future time a plan may be devised which will relieve the student and the instructor.

PHYSICS, THE FOUNDATION OF PHARMACEUTICAL PEDAGOGICS.

BY JOSEPH FEIL, PH. G.

We are confronted in pharmaceutical teaching with precisely the same complaint that is heard from every technical and literary college in this country, namely, that students are not prepared for the work they wish to undertake. Enthusiasm, earnestness and determination are not lacking, but a misconception of the requirements necessary to master the sciences which constitute the foundations of the art of pharmacy are woefully conspicuous in a large majority of instances.

Attempts to eradicate this fundamentally serious condition have been made over and over again, the sole remedy suggested being that druggists should exercise greater care in the selection of apprentices, and not employ boys whose education does not give hope of future mastery of the pharmaceutical arts and sciences.

But the very idea of being compelled to employ, of course at some pecuniary compensation, reacts against the possibility of quality of mind, and is apt to bring into consideration quality of muscle as the preponderating qualification; the long hours of the drug store compared with other stores, act as a restraint against obtaining the best help; and, lastly, the druggist's loud cry about the deterioration of his calling has acted very strongly in the same direction.

We must work on the material presented to us, and while we should do everything to secure the best, yet in the present nature of the conditions, we must concentrate our efforts in the direction of making the fairly passable into the highest obtainable. A mind capable of careful and intelligent observation is the quality most desirable in our pupils, and this condition is rarely a natural one, but results from correct education.

An educational instrument of unusually peculiar value for this purpose lies in a well-graded series of physical experiments, supplemented by a good scientific text-book, and above all by rigid, thoroughly-studied recitations.

These experiments should be well graded and selected with a view to both pharmaceutical and chemical future uses, and could with enormous profit supplement much so-called pharmaceutical laboratory work, which, at its best, is only a repetition of what the student knows, or what he ought to know if he has had any practical experience, and while of great technical use, its educational force and developmental value is almost nothing.

I append an outline of some experiments of this nature, which can be readily performed in any ordinary pharmaceutical or chemical laboratory, or even on common kitchen tables, and from experience know they tend to bring out, expand and develop those perceptive powers required to understand the principles and theories of modern sciences and the processes of everyday pharmacy.

The following is not intended as a complete set of experiments, but simply to indicate the direction in which the work has proved valuable:

EXPERIMENTS.

1. Apparatus.—Accurate foot ruler. Make a metric ruler graduated to m. m.

2. App.—Metric ruler and hollow metallic cube open on one side. Determine contents of cube, and calculate the quantity of water it should contain; counterpoise it on a Harvard balance, fill it with water and accurately weigh the water. Compare results.

3. Repeat 2 with a glass cylinder such as a mixing jar.

4. Repeat 2 with a burette, measuring it from the 0 to 50 marks,

5. App.—Glass tube, cork, graduates. Determine cross-section and internal diameter by measuring length and volume. Cork tube, pour in 1 Cc. water and note height by rubber band. Add 10 Cc. water and note if its length is 10 times that of first Cc.

6. App.—Irregular piece of metal, graduated cylinder. Determine volume of metal by the water it displaces.

7. App.—Same piece of metal, balance, cylinder. Weigh metal in air, then in water, compare, note loss, compare loss with volume found in 6; calculate Sp. Gr. of metal.

8. App.—2-oz.-bottle or Sp.-Gr.-bottle, various liquids. Counterpoise bottle and determine by weight its contents of water, alcohol, benzin, syrup, etc. Compare.

9. Ruler, lead or shot, cylinder. Put shot or lead toward one end of ruler so that it floats vertically in water to about half its length; note where it marks water level and mark 1000, then float in other liquids, such as alcohol, benzin, etc.; mark levels and compare with 8.

10. App.—Wax, lead, balance, cylinder. Determine Sp. Gr. of wax.

11. Metallic rods, wax distributed at intervals, burner. To show how heat travels and the variability of its effect on different substances.

12. Fill a test-tube two-thirds full of water, heat at bottom to boiling, allow to cool and heat near surface.

13. App.—Thermometer, ice, boiling water, boiling alcohol. Test correctness of thermometer by comparing the temperatures the articles show and the ones they should show at stated in U. S. P.

14. App.—Tested thermometer, various substances, proper flasks. Determine a number of boiling points.

15. App.—As in 14. Determine various melting points.

16. Ice water, boiling water. Mix equal quantities and note temperature.

17. A few experiments in magnetism, electricity and light would be a valuable addition; such may be found in any of the many excellent manuals for the physical laboratory published by Ginn & Co., American Book Co., Heath & Co., Allyn & Bacon, H. Holt & Co., and other publishers.

Cleveland, O., August 1, 1898.

THE PHARMACIST IN MEXICO.

BY B. F. G. EGELING, M. D., CITY OF MEXICO.

It is a curious fact that the present condition of pharmacy in a country so closely allied to the United States from a commercial point of view has become so very little known beyond its boundary lines. The reason is probably that comparatively very few foreigners are actually engaged in the retail drug business in Mexico. The wholesale trade as a fact is to at least three-fourths in the hands of Europeans, mostly Germans. Among the thousand pharmacies in the Republic, however, there are only a few owned by foreigners, and there exists only one real American house, owned and operated by Americans; also the sign "American Drug Store," etc., etc., may be met with in various places, especially in those with a larger percentage of American population. A consequence of these conditions is, that as regards the professional education of the Mexican pharmacist, as well as how he practices his profession, very little is known, and of what has been made public, a good many erroneous impressions exist, which latter are yet more propagated by persons who publish an opinion formed on a few days' excursion to this country. The writer therefore ventures to hope it may not prove quite uninteresting to draw a picture of the actual state of pharmacy in the Mexican Republic, based upon a practical professional experience during a nearly six years' residence in the country.

His observations published at various times during 1891 and 1892 in the American Pharmaceutical Press are not any more consistent with the actual state of affairs of this day. At that period pharmaceutical education in this republic was in its childhood, or, more properly, had gone to sleep. For, already in the middle of the present century, pharmacy in Mexico had reached a high standard. The Pharmacopœia of 1842 for instance, from a scientific point of view, clearly deserves a higher rating than its successors of 1874 and 1884. The poor means of communication fifty years ago *forced* the pharmacist to be a pharmaceutical chemist, to pay closer attention to his laboratory and not only to make his own pharmaceutical specialties and galenical preparations, but also to a large extent his chemicals. It required four to six months to get his goods from Europe, and during the American Civil War it was impossible to obtain merchandise from the United States. Thanks to these conditions so unfavorable to general commerce, he was kept high above the mere patent medicine vender, who considers the aim of his life reached if he is able to put up a simple prescription, and who unfortunately may be found so frequently among the members of the profession at this time. Later on, under more favorable conditions to international commerce, the Mexican pharmacist commenced to buy his chemicals from France, Germany, England, and by and by to a certain degree from the United States. The American preparations were at first not looked upon favorably by the general public, and the writer remembers very well the time when it was almost impossible to sell an original bottle of Powers and Weightman's quinine. These conditions have changed of late, and that the United States do not hold the bulk of the drug trade with Mexico is the fault of their own wholesalers. It must be admitted, however, that up to a few months ago there did not exist such a thing as a mercantile agency, and it was difficult, if not impossible, to obtain correct information as to the commercial responsibility of a customer. The laws were, unfortunately, such as to expose an institution of that character to criminal proceedings for libel in case of a damaging report. Some months ago, however, R. G. Dun & Co. opened an agency in Mexico City, and the Mexican government has guaranteed them such privileges as to make their work effective.

Up to the beginning of this decennium the entire practice of pharmacy was in the hands of physicians. Barely two per cent. of all the drug stores in the country were owned by real pharmacists, and these latter were, with very few exceptions, Germans. Even to this day, more than seven-eighths of the foreign apothecaries in Mexico are of German nationality. Altogether this number is such a limited one, that with almost a certainty the number of those pharmacists who received their education in a foreign country may be taken as below thirty. The few establishments owned and managed by practical and scientific pharmacists were at that period the only ones worthy of the name of pharmacy. The rest were more or less poor excuses for such a thing. Every physician almost had his own "Botica" (drug store), where, more or less, all of his own prescriptions were filled. For economy's sake, boys 16 or 18 years of age took the place of pharmacists, and, as a matter of course, were only "drilled" for the prescriptions of their master. This was a miserable state of affairs, and a great many of these so-called "Boticas" were nothing more than death-traps. In Monterey, for instance, one of the most Americanized cities in the Republic, and having a population of some 60,000 inhabitants, there existed some 40 of such menaces to health and life, in spite of the existing rigid laws. Unfortunately, these laws existed only on the paper. But even a well-paid drug store inspector—a physician—existed, whose duty it was to examine every drug store within his district, at least once in every six months; he, however, only performed one part of his duty with remarkably regularity—that was, to draw his salary.

This state of affairs at last became untenable with the growing immigration from the United States and Europe, and the better class of physicians, especially those who had studied in Europe (many Mexican physicians visited for a year or two European universities, especially the one at Paris), became thoroughly disgusted, and exerted a pressure upon the respective governments of their States. In the north, the State of Nuevo Leon gave the start. Its always progressive governor, Bernardo Reyes, November 10th, 1891, signed a new law, regulating the practice of pharmacy in his State. These new laws now did not remain a dead letter, and the various governments did not only create the necessary offices with the required authority, but also provided the money indispensable for their execution. In this respect, the various legislatures in the United States could learn a good deal from Mexico. One of the provisions of the law was, that hereafter *every* pharmacy had *constantly* to be in charge of a properly qualified pharmacist (this means in Mexico, where only college education is recognized, and where no Board-examinations exist, consequently a graduate), or the store would be closed, the law to take effect *immediately*. Those would-be pharmacists above referred to howled, but nevertheless the law had a wonderful effect. Inside of a year Monterey, for instance, instead of forty miserable joints, had fourteen drug stores, and some of them very creditable. Now-a-days in Mexico a medical diploma does not entitle any one to run a drug store; the Government recognizes either a diploma from one of the Mexican Pharmaceutical Colleges, which, by the way, form a part of the schools of medicine, or from a foreign recognized College of Pharmacy. The diplomas of the latter, however, have to be certified to by the respective Mexican Consuls. The Board of Health of the Federal District—a territory equivalent to the District of Columbia—is even more exacting. This Board does not recognize any diplomas at all, except those issued by the National School of Medicine in the city of Mexico. The Pharmaceutical College of this latter School is undoubtedly the foremost in the Republic. The only advantages holders of foreign diplomas possess, are, to be allowed, after having their diplomas properly certified by the respective Mexican Consuls, to appear before the regular Examining Board of the College, and to pass their examinations without having previously completed the course of study required by law. The title conferred upon a graduated pharmacist is, officially, "Profesor en Pharmacia."

Curiously enough, little attention is paid to practical experience *before* the college course. Those advocates of a similar state of affairs in the United States should come to Mexico. Here probably they would be able to convince themselves within a very short time how utterly wrong their theory is. It appears a pity indeed—and you can see it almost daily—a young man with a good school and a good college education, but without any practical training, to be turned loose upon the unsuspecting public and to stand helpless as a child before the first question requiring a little practice, and sometimes so simple to solve that it would appear laughable, if it were not such a serious matter. Nowhere has it appeared to the writer as clear, of how little value the best university education may be in the pharmaceutical education without a certain practical training *beforehand*. That a person should hold a responsible position, and gain practical training in his profession *while* holding it, seems absurd.

The elementary education is the same with all children in Mexico, and regular school attendance is required from the sixth to the fourteenth year. The subjects taught also are the same with all children, whether they attend the public schools or the better class of educational institutions.

In case a young man intends to devote himself to pharmacy, or another profession requiring a university education, he has to enter the Collegio Civil, an institution similar to a high school, with a five years' course. He must be at least twelve years of age, and pass an examination to prove that he has acquired the necessary knowledge in the elementary school, before he can enter this higher class. The educational year in this high school consists of nine months, two months are holy-days, and one month in every year is used for examinations. Much attention is paid to these latter, and the boy must pass them satisfactorily before he can enter a higher class. Having concluded this five years' course to the satisfaction of his teachers, the young man is entitled to be matriculated at the College of

Pharmacy, but has to enter documentary proof of his entire preliminary education.

The college course lasts four years. The lectures begin on October 1st, and end June 30th. The month of July is reserved for repetitions and examinations. The entire fees amount to $265.00, including $5.00 for matriculation and $80.00 examination fee. These fees are payable quarterly, *prænumerando*. The lectures comprise a full course in theoretical and practical pharmacy, pharmaceutical chemistry, history of drugs, materia medica and therapeutics, medical law, hygiene and medical ethics.

Until recently the students were compelled to work during their four years' studies in the different hospital dispensaries, but according to an ordinance of October 30, 1894, they have to work during the first year in a drug store, attending to the counter trade; during the second year of their college course work at the prescription counter is required; the third year is to be spent in a laboratory, and the fourth again behind the prescription counter. All this work has to be done according to law, in a regular pharmacy, under the direct supervision of a graduate in the same establishment, or with special permission of the Dean of the Faculty in different ones. Documentary proof has to be furnished that the law in this respect has been complied with before the candidate can be admitted to final examination. This final examination has to be passed before an examination committee, consisting of the rector of the university, the dean of the faculty, and three professors, and always takes place in July. The students are under very strict supervision, and in case any one of them should miss twenty lectures during one term, he is compelled to take the same term over again before he can be admitted to graduation.

The majority of Mexico's population being extraordinarily poor, comparatively few only could afford to send their sons to college, especially since formerly the prospects of a pharmacist were by no means very brilliant, and under the most favorable circumstances he was not enabled to make a living until 22 years of age. The number of properly qualified persons was consequently always very small. With the strict enforcement of the laws, the demand for professors naturally increased considerably, and they could command a better salary than before; also the natives never earn the same wages as a foreigner, provided the latter knows the language. It may be truly said that the lot of the drug clerk in Mexico is a much better one than that of his colleague in the United States—thanks to the rigid enforcement of the laws.

In various other respects the new laws had a very good effect. After the countless little drug shanties had been exterminated, the remaining ones, the better class, took more pride in the appearance of their stores. In 1891, the writer could say in an article describing the most prominent drug store in Monterey, that this establishment had doors that many a farmer would be ashamed to use on his barn, and that there was not a window pane in the house. These were facts eight years ago, but since then matters here have materially changed. There are now pharmacies to be seen in many places in the Republic that would be a credit to any city in the United States. It will be hard to find a neater pharmacy than the Botica Iturbidi in Mexico City, or Labardie's drug store of the same place. It may be mentioned here, that there is a vast difference in Mexico between a pharmacy (Botica) and a drug store (Drogueria). The former relies mainly on prescription trade, etc., while the other sells drugs, fancy goods, etc., and has no right to fill prescriptions, nor compound medicines of any kind. Nevertheless, the " drug stores" also have to employ a graduate in pharmacy, who is responsible for the purity, etc , of the drugs sold. The physician who formerly considered his duty as drug-store investigator fulfilled when he had signed the receipt for his salary, has been ousted, and practical pharmacists have been employed, who *know* and *do* their duty. Various points in the new Mexican pharmacy laws deserve the attention of legislators; for instance there has to be in every pharmacy a good *microscope*; further, a certain number of pharmaceutical works, first of all, of course, the Mexican Pharmacopœia, the United States Dispensatory, Dorvault's L'Officine, etc. A complete laboratory outfit, including reagent chart, etc., are among the requirements. Before any drug store may be opened to the public, the drug-store inspector has to be notified. He must carefully inspect as to quality the drugs and medicines on hand; also, whether those articles that the law requires are in stock. There must be a complete assortment of all ordinarily used drugs on hand before he can permit the store to open. From time to time a list of these goods is issued by the government. A posological table is also published by the government, and if the dosis maxima is exceeded, the prescribing physician is compelled to state over his signature that it was his intention to prescribe the dosis in question. In case the dispensing pharmacist compounds such prescription without this written statement, he makes himself liable to fine and imprisonment. Private formulas are strictly prohibited, and physician, as well as druggist, are subject to a heavy fine in each and every infraction of this law.

It is the rule in Mexico to return the prescriptions to the customer with the medicine, and they are only retained in case the prescription should not be paid for. They then serve as a voucher. Whether returned or not, each and every physician's prescription has to be copied into a book kept for this purpose. Prices must be marked on the original prescriptions in plain figures—a good rule, especially in a country where the "cutter" is a thing unknown.

De verbum "Cutter." In this country, the pharmacist, as well as the druggist, believe in a legitimate profit, and are able to obtain same. Thank the Lord, the drug business is not yet so demoralized that a business man is obliged to sell almost at cost. It is a fact that the Mexican tries to get goods as cheap as he can, and "bartering" is one of his most prominent characteristics; he is, however, shrewd enough to know that a person must make money somewhere, or he would not be in business. He knows well enough that nobody is in business for his health. If a druggist, or any other person, therefore, sells goods at a much lower price than another, he begins to mistrust him, and on the slightest occasion will return to the higher-priced competitor. It has proven an indisputable fact that those houses that charge a reasonable profit, and never deviate a cent from the price once stated, but rather let the customer depart, do the best business in the end.

In any country the same results could be obtained. Laws do not elevate a profession upon a higher standard, unless they are rigidly enforced. Mexico is just as good a market for patent medicines as any other country, but their sale is largely confined to the "Droguerias"; the pharmacist devotes his time to the profession, and, as a rule, makes a success.

THE UNITED STATES PHARMACOPŒIA AND THE MEDICAL PROFESSION.

BY F. E. STEWART, NEW YORK.

Last April I received a letter from the Chairman of this Section devoted to the educational interests of the profession of pharmacy as represented by the American Pharmaceutical Association, asking me to contribute a paper on the subject "Present a Plan whereby the United States Pharmacopœia may be made more largely acceptable to the Medical Profession, and recognized as an Authority in Medical Instruction."

I doubt very much whether the medical profession will ever accept the dictum of the Committee of Revision as to what physicians shall or shall not prescribe in the treatment of the sick. Drug therapy is founded for the most part upon inconclusive experiments, for there is no way of determining the true therapeutic value of a drug with sufficient exactness to settle its place in the Materia Medica once for all. From a therapeutic point of view therefore it is not likely that the Pharmacopœia will ever attain that authority in medical instruction so much desired and so much desirable; but it may and should become authoritative in regard to standards of strength, quality and methods of manufacturing every preparation of medicine described in it which the physician prescribes.

To make the Pharmacopœia more largely acceptable to the medical profession it should follow the profession and not attempt to lead it; for thus it will gradually win its way in professional favor, and become of more influence in the long run for the guidance of professional thought. By placing in the Pharmacopœia information that physicians desire and are entitled to have in relation to the source, composition and method of manufacture of medicinal products, they will become interested in the Pharmacopœia and purchase it as a work of reference. Practically, however, physicians as a rule are so poorly educated in pharmacologic science that much of the information of this nature is unassimilable to many of them. A higher standard of instruction in pharmacology should therefore be adopted by our medical schools. I use the word "pharmacology" not in its restricted meaning as applied to physiological activities of medicinal substances, but in its wider meaning as embracing the science of drugs, including materia medica, pharmacy and therapeutics.

An obstacle which has stood in the way of making the United States Pharmacopœia more largely acceptable to the medical profession has been the misunderstanding with regard to our patent and trade-mark laws as related to medical science and its associated arts. The patent law was devised for the very purpose of promoting progress in science and the useful arts, and rewarding those engaged in original research. A patent is a *grant* upon the part of the people to the inventor of a new and useful invention displaying a greater amount of skill than is naturally to be expected from those skilled in the art to which the invention pertains, or is the more nearly related. The inventor is granted the right to prevent others from copying his invention for a limited number of years, in exchange for the publication of full knowledge of the invention, whereby it may be practiced by the public after the patent expires.

The knowledge of the invention becomes at once public property and may be used for the purpose of improving upon the invention or devising something more effective. Is there anything in the patent law, if *properly applied* to medical science and art, which should cause hesitation in making patented medicinal products official in the Pharmacopœia?

The Committee of Revision may say that the commonly-accepted names of many of the patented medicinal substances so largely prescribed by the medical profession are registered as trade-marks and are private property, and shall the Committee give the manufacturers of proprietary medicinal substances monopolized indefinitely in this manner, gratuitous advertising in the Pharmacopœia by making these products official?

Inventors who publish their inventions for the benefit of science by patenting them should be rewarded by having a place given their products in the Pharmacopœia, but the trade-mark system referred to has been standing as a blockade in the way of it. It seems to me, however, that the United States Supreme Court has pretty well destroyed this blockade, so that patented medicinal substances may now be properly admitted into the Pharmacopœia and recognized therein under their commonly accepted names. The Singer Sewing Machine Company registered the word "Singer" as a trade-mark on sewing machines, but it availed nothing when the validity of their trade-mark was called in question, for the United States Supreme Court decided that the word "Singer" was a generic term used to distinguish between different kinds of sewing machines, not a trade-mark serving to distinguish between different brands of the same sewing machine. The patent having expired, the public has a perfect right to make the Singer sewing machine and an equal right to use its commonly-accepted name when dealing in it, provided each manufacturer is careful to distinguish his brand of the Singer Sewing Machine in such manner as to prevent purchasers from being deceived in regard to the source of manufacture. As trees must have names to distinguish between them as to family, genus and species, so must every new thing placed on the market for sale have a name by which it may be recognized and dealt in.

The same principle was affirmed in the Castoria case. The word "Castoria" was used by the Centaur Company, not for the purpose of distinguishing their brand of a well-known article of commerce from another brand of the same thing, but to distinguish a certain medicinal preparation from all other medicinal preparations. The word "Castoria" therefore was not used as a trade-mark, but as an appellative.

The plan which I would suggest, whereby the United States Pharmacopœia may be made more largely acceptable to the medical profession, and recognized as an authority in medical instruction, is to include within its pages all of the patented medicinal substances which are generally prescribed by the medical profession, provided the formulas contained in the letters patent, that may be obtained from the Patent Office, are sufficiently clear to enable skilled chemists to reproduce the products, as required by the patent law. If the formulas are not correct as demanded by law the patents themselves are made void thereby, therefore the fact that they have been tested and found wanting by the Committee should be published for the benefit of all concerned. And each patented product made official should appear in the Pharmacopœia under its commonly accepted name, either as the official title or associated therewith as a synonym.

THE SCHOOL OF PRACTICAL EXPERIENCE.

(*Written for the Juniors*)

BY E. L. PATCH, BOSTON, MASS.

Much has been said concerning the relation of practical experience to the so-called theoretical school training in preparing for a pharmaceutical career. Not a little of this seems to have been actuated by the prejudice of past methods rather than inspired by observation of present conditions and the lessons of real experience.

The demand is to place pharmacy upon the plane of a pure profession, yet the effort to give the novice the same thorough preliminary training that the lawyer, the physician and the theologian must have before entering upon their practical experience, is discredited.

To be sure experience is often lauded as the best teacher, but her worth depends upon her lessons and upon the receptivity of her pupil. She is as apt to teach lessons that were better never learned, as to teach those of practical value. Unless they are guided by correct theory, her book had better remain closed. Thousands of young men have experienced the bad effects of acquiring wrong habits of thought and action,—have even tasted the bitterness that follows the indulgence in vice or the thwarting of their advancement by yielding to a spirit of indifference and love of ease and pleasure, but how many are taught by the experience to throw off the yoke, assert their manhood and re win the lost field of struggle.

Is not experience the forger of habit and does not unwise experience hang to one like a ball and chain to a criminal, preventing the restoral of a shattered ideal or the creation of a new one? Is it not better to be thoroughly drilled in correct theory and a habit of observation that will enable one to avoid misleading experience and to move continuously along the way of actual service and real success? Common sense says yes, even if prejudice curls the lip.

As in life, so in pharmacy, there are many experiences at the outset that are calculated to check advance, to so dwarf and belittle the calling in the eyes of the new aspirant as to prevent his rising above the level of his surroundings. How many students have said to me "what is the use of my learning all this, they never need or use it in the store where I am employed?"

Following this question in many cases came a drop to the low level of working for rank only, or the lower one of acquiring that which seemed practical in the narrow vision of the questioner, measured by the boundary of immediate environment; while no word of encouragement could arouse a purpose to store up principles of knowledge, to strengthen the mind and to control action on a higher plane in an unknown future. The same young men, kept from the unfortunate if not erroneous teachings of a narrow practical experience, might have been inspired to strive for the high ideal of a perfect training for an important calling, and under such impulse have acquired a discipline of mind, a steadiness of purpose, a thoroughness of manipulative skill, and a mastery of the right theory on which all legitimate and proper practice is based, that would have permanently fixed their place in the vanguard of their calling, sustained by their increased resourcefulness on each occasion of a new experience.

If unable to locate in pharmacy free from the blight of prejudice and an unjust public suspicion classing them as dram sellers, drink mixers, petty merchants and panderers to the depravity of snuff dippers, morphine users, cocaine victims and ether snuffers, they would not drop to the level an improper public sentiment would consign them to, but would rise so far above it as to prove its falsity, or would step forward into a medical career doubly equipped for successful service.

These preliminary thoughts might be enlarged upon to practical purpose, but enough has been said to convey our thought that correct theory should precede correct practice, and in a rambling sort of way, we will call attention to some experiences which are, and some which are not, practical.

It is good in theory to acquire habits of industry, promptness, neatness, accuracy and politeness, and any young man having an employer who insists rigidly upon their practice, should be grateful for his good fortune.

It is *not* practical to know the little that is dangerous. Such an attitude leads the clerk to criticize the prescription, to neglect study, and to become over officious. This is illustrated by a recent experience in our city, when a young lady customer calling for a prescription containing copaiba, was insulted by the familiar remarks of the clerk. Had he more than the little knowledge that is dangerous, he would have known that copaiba is used for chronic dysentery, for hemorrhoids, for chronic bronchitis and other troubles besides that one uppermost in his mind. Lacking this knowledge, his insulting insinuations to a chaste, high-minded and spirited young lady, cost him his situation, and may cost still more in the future.

It *is* practical to cleanse dishes and apparatus as soon as used, and not permit the formation of hard residues from the evaporation of any remaining liquid ; yet how often this is neglected at the cost of much subsequent annoyance and loss of time !

It is *not* practical to place steel spatulas in the sink after using, often causing them to discolor or rust, impairing their smoothness and their strength. They should be cleansed as soon as used.

Some of these points considered of minor importance may result in large savings in the course of a long experience. As the student listens to his teachers, such suggestions may appear theoretical, but he can convert such theory into practice to great advantage. The relation of the teacher's theory to the student's practice may be illustrated.

The lecturer stated that calcium chloride was a type of deliquescent bodies. The meaning of the term was given and illustrated, and a list supplied of substances belonging to this class. Later on came a classification of the materials called for in pill form, and a classification of excipients, telling what were best absorbents, what best to use as mere diluents, and what to give proper cohesiveness and plasticity. Then came instruction in the theory of pill coating and in the practice of gelatin coating. A prescription is written, calling for seventy-five grains of calcium chloride in sixty salol coated pills. Let me tell you its experience. Druggist number one telephones to every wholesaler in town to ascertain if they have a stock pill of 1¼ grain of calcium chloride, salol coated, made by any manufacturer. Failing to find such, he returns the prescription to the patient with the information that the article called for cannot be obtained.

Druggist number two, remembering the very deliquescent character of the calcium chloride, informs the customer that the pill will not keep if it is made. The patient, after visiting several stores and becoming about convinced that the specialist he has paid a ten dollar fee to is an ignoramus, at least so far as pharmacy is concerned, stumbles upon a theoretical college boy. As soon as he reads the prescriptions, the three lectures, "Deliquescence, Pill Making and Pill Coating," come to mind. To his 75 grains of calcium chloride, he adds an equal weight of powdered althæa and two-thirds of its weight of powdered acacia. If it is a damp day he will add two or three drops of water; if a dry day, ten or more. As soon as made he will impale the pills upon the needles of the coating machine, and subsequently dip them in melted salol contained in a short straight tube placed in a water-bath. After dipping sufficiently he will touch the needle holes with a camel-hair brush dipped in the melted salol. He will *not* melt fifty cents' worth of salol in an open capsule, and placing this capsule in direct contact with flame, decompose the salol. His lecture upon the fusing point, and his classified table, will remind him that salol fuses at the low temperature of 110° F. At once he has re-established the faith of the patient in his physician and convinced him that he should bring his prescriptions to the store where *he* is employed, if he would save time and annoyance.

It seemed a small matter that the student was told to remove all spiculæ of glass from a bottle before placing a chemical solution in it; but when several bottles have been returned whose contents were decomposed or precipitated by the roughness of the interior of the bottle, it becomes a practical suggestion. To the student it appeared an over-refinement of theory to be told to use porcelain shot in removing precipitates, or if lead shot was used, to remove all adhering lead from the surface of the bottle by rinsing with a little nitric acid; but when he has had one or two serious experiences from failure to observe this precaution the theory becomes practical.'

The statement that gentian, dandelion and some other drugs contain sugar, and in manipulating them care should be exercised to prevent fermentation, assumes a practical character when the acid in a solid extract has decomposed a pill mass containing it, reflecting upon one's knowledge and skill unfavorably.

The statement that glycerin is hygroscopic assumes practical value when one has compared the keeping qualities of extracts containing it, with those free from it. The possibility of solid extracts containing copper from being made in copper pans, ceases to be a theory after a spatula previously moistened or dipped in acidulated water has been allowed to remain in contact with the extract for a few hours and upon removal found to be coated with copper. The suggestion *not* to fill shelf bottles too full and to avoid fixing too firmly in place the stoppers of those containing solutions of gases or volatile liquids, becomes practical after an increase in the atmospheric temperature has caused an expansion of the liquid or a disengagement of gas, resulting in the bursting of the container with damage to the fixtures and the neighboring stock.

The warning *not* to tightly bottle a prescription in which there is a reaction until such reaction is entirely over, may have been passed by unheeded; but after a cough mixture containing ammonium carbonate and syrup of squill explodes, or one containing fresh spirit of nitrous ether, fluid extract of buchu and fluid extract of uva ursi, or one containing freshly prepared neutral mixture, or one with recently made nitrohydrochloric acid bursts in the hands or pocket of a customer or upon a parlor shelf, care is exercised to prepare such mixtures in a broad, shallow vessel, using the extended surface, shallow depth and constant trituration to favor the escape of the generated gas and to guard against their being bottled before the reaction is over.

Do *not*, as did one, place an ounce of sodium bicarbonate and six drachms of salicylic acid in a mortar and add all at once six ounces of water, then when the mixture effervesced and flowed out of the mortar over the counter, try again by putting similar ingredients in a quart bottle, tying in the stopper, and giving it to another to shake, with the result of an explosion, causing serious loss and damage. Place the solids in a mortar and add the liquid very slowly, controlling the reaction.

The statement that density of precipitation is controlled by density of solution, and that an excess of alkali dissolves many alkaloids and decomposes others, may have had no practical value in the lecture room: but when a 40 per cent. loss is made in separating an alkaloid, or failure is met in assay processes from neglect to take these statements into account, they assume a commercial importance.

But theory and fact must be practically applied. We have known a graduate in pharmacy to condemn a select iodide of sodium and pronounce it bromide. Scrutiny of his method revealed the fact that instead of adding chlorine water to a 5 per cent. solution of the salt and subsequently adding chloroform to obtain a violet-colored solution, he had used a concentrated solution of the salt and an insufficiency of chlorine, and forgetting that the excess of the salt had a stronger affinity for the iodine than the chloroform could exert, read his faint coloration of the chloroform as due to bromine.

Apply the U. S. P. test to potassic iodide, and then add an excess of the salt until it removes the color from the chloroform, you will get my meaning.

The estimation of extractive percentages may have seemed a simple process and an unimportant matter. Yet we have known three operators to differ 20 per cent. in estimating extractive, owing to difference in temperature and thoroughness of extraction, and we have known a customer to be detected in removing 35 per cent of a shipment of goods, replacing it with water, and returning as defective, the fraud being discovered by taking the extractive percentage and comparing it with that of the same lot as sent out. When by extractive determination we learn that a fluid extract is only 60 per cent. as strong as a previous lot made from the same drug, it informs us of an error in packing, rate of flow, or too low a temperature, and permits us to correct the defect. It also enables us to discover why some lots of fluid extracts precipitate while others do not. In one instance they are so deficient in soluble extractive as to be free from all liability to deposit.

The lectures on specific gravity may have appeared too moist or too dry to make a favorable impression; but when experience teaches that the application of it may save from two to five dollars on a barrel of alcohol, may prevent the keeping of a barrel of witch hazel so deficient in alcohol as to surely spoil, may be a quick method of determining the approximate strength of solutions and the purity of many substances, specific gravity is better appreciated.

The details and principles of color-reactions, precipitation, etc., may interest the student only by their novelty; but if applied to purchased stock, with the result of gaining a positive knowledge of its character and value, with occasional discovery of marked inferiority or accidental substitution, they become practical.

The theoretically trained pharmacist, instead of waiting four or five days for a chemical salt not in stock or readily obtainable of his wholesaler, prepares it from materials at hand. In place of purchasing an ounce of solid extract to dispense a scruple or so upon a stray prescription, he prepares it by evaporation of a suitable fluid extract, or if need be, by exhaustion of the drug and evaporation of the percolate.

The pharmacist well trained in theory is often able to surmount difficulties or explain them away in cases where he has not had previous experience. Hence, while it may be true that the compensation of pharmacy does not give adequate return for a high training, we believe that a thorough college training in the theory of pharmacy and college laboratory practice in its manipulations, may prove of more service to the beginner than the narrow, abortive training received in many stores.

OUTLINE OF A COURSE IN ORGANIC CHEMISTRY FOR PHARMACISTS.

BY FREDERICK J. WULLING, MINNEAPOLIS, MINN.

The 18 to 24-lecture course in organic chemistry without an hour's work is a back number.

It is the purpose of this brief paper to outline what seems to the writer to be the minimum amount of laboratory work that should be required of candidates for Graduate in Pharmacy. Six or eight preliminary lectures should precede the laboratory work, and during the execution of the work lectures should be given concurrently with the work in hand, besides individual instruction in the laboratory. The following work can be done in about 4 months, 10 hours weekly:

1. Preparation of acetanilid.
2. Valuation of carbolic acid.
3. Preparation of dilute hydrocyanic acid (by distillation K_4FeCy_6 and H_2SO_4).

4. Preparation of salicylic acid.
5. “ “ resorcin.
6. “ “ salol.
7. “ “ pyroxylon.
8. “ “ alcohol (fermentation and distillation).
9. “ “ spirit of nitrous ether (U. S. P. method).
10. Determination of $C_2H_5NO_2$ in finished products of No. 9.
11. Estimation of N_2O_2 (or NO) in $NaNO_2$.
12. Preparation of acetic acid (from $NaC_2H_3O_2$ fused).
13. “ “ chloroform.
14. “ “ iodoform.
15. “ “ tartaric acid.
16. “ “ ether (U. S. P.).
17. “ “ caffeine.
18. An operation in fractional distillation.
19. “ “ “ determination of melting point.
20. “ “ “ “ “ boiling point.
21. Fermentation (glucose).
22. Preparation of aldehyde.
23. “ “ acetic ether.
24. “ “ oxalic acid (sugar and HNO_3).
25. “ “ urea from urine.
26. “ “ “ “ NH_4CNO.
27. “ “ salicylic acid from Ol. Gaultheriæ.
28. “ “ “ “ “ phenol.
29. “ “ benzene (?)
30. “ “ nitrobenzene (?)
31. “ “ aniline.
32. Preparation of picric acid.
33. An operation in proximate organic analysis.
34. “ “ “ the determination of molecular formula (sugar or acetic acid or both).
35. Preparation of benzoic acid (from benzyl chloride).
36. Flashing point of kerosene.
37. An operation in saponification.

Of course the work would not be taken in the order given; it would begin with the simpler operations.

This outline does not include the examination and testing of organic pharmaceuticals according to the directions of the U. S. P., which work is usually carried on in the pharmaceutical laboratory.

The above, or its equivalent, constitutes the work in organic chemistry for the senior classes of the College of Pharmacy of the University of Minnesota. It is designed to increase the work the coming year.

REPORT

ON THE

PROGRESS OF PHARMACY.

From July 1, 1897, to June 30, 1898.

By C. Lewis Diehl.

INTRODUCTORY.

If it were possible to confine the subjects to be considered in this introductory to such as concern the progress made in our knowledge of the sciences related to pharmacy and the technical improvements made in its practice, the report would doubtless prove more acceptable to those of our members who have in the past combated, and continue manfully to combat the innovations which threaten our professional existence. Unfortunately the factors that are brought to bear so unfavorably upon our profession are unceasingly at work, and cannot therefore be ignored in a report which professes to record pharmaceutic progress; true progress in a profession being emphasized, favorably or otherwise, according to the conditions under which the profession is practiced.

In a dual profession like ours, partly mercantile and partly professional, every effort should be made to reconcile the commercial with the professional interests; but there exists, as a matter of fact, a persistent strife for the ascendency of the one over the other. Measured from the commercial standpoint, the dictum is to meet competition. This means to buy cheap and sell cheap; and if this could be done with fairness all around—to the buyer and to the seller, to the physician and to the patient—there would be no just cause for complaint by any one. From the professional standpoint, on the other hand, the claim is made that the rules that govern the selling price in ordinary commercial transactions cannot apply to the practice of pharmacy. Not to speak of the professional compensation to which the pharmacist is entitled for compounding and prescription work, the goods supplied by him must be the very best of their kind, irrespective of cost. Thousands of articles, many of them of a perishable nature, must be kept in stock in order to promptly meet the demand of the physician and the public, and the possible loss from this source, as well as by reason of the ephemeral demand for some classes of goods, the necessarily large expense of handling and dispensing them—an expense altogether out of proportion to the sum of the sales—make it utterly impossible to compute their cost by the rules commonly applied to merchandise.

Under the old conditions, these opposing factors were easily reconciled by the pharmacist. His purely mercantile transactions were confined to certain side-lines, such as perfumery and other toilet requisites, sponges and chamois, cigars and tobacco, etc., in which he could and did compete with other dealers at a fair profit; whilst in the line of medicines, the public readily conceded the prices that were justly demanded. But with the advent of the department store came the harbinger of disaster. One by one the side-lines of the pharmacist were invaded and his profits from this source nullified or reduced to a mere pittance. Then came the onslaught on proprietary medicines, which had supposedly been securely the perquisites of the pharmacist, and with it the omnipresent cut-rate store. And this is not all; for the pharmacist, shorn of his profits in side-lines and patent medicines, must be still further depleted by invasion into the domain of legitimate medicine, so that at the present day he is compelled to pay a royalty to manufacturers and dealers on a large proportion of the prescriptions he is called to dispense. What wonder, then, that under these conditions the commercial factor should largely preponderate over the professional in our pharmacies, and that the fear would appear to be well grounded, that in the evolution through which pharmacy is now passing, the professional may eventually succumb to the mercantile element.

The reporter is well aware that in the foregoing he has brought forward nothing that is not familiar to every member of the Association, his purpose being simply to introduce a subject that has, in some form or other, been discussed at last year's meetings of every State Pharmaceutical Association whose report of proceedings has reached him. Indeed, it is not alone on this side of the Atlantic that these unsatisfactory conditions prevail, and give rise to discussion; for the same, or similar problems, evidently confront the pharmacists of Great Britain, as witness a paper read at the meeting of the British Pharmaceutical Conference at Glasgow, in 1897, by Mr. Lee Atkinson, entitled,

Pharmaceutical Ethics.—Referring to the classical paper on the subject, read by Mr. Joseph Ince, thirty-one years before, at the Nottingham Conference, he observes that what was held to be true then for the government of the ethical conduct of pharmacy, at a time when the Pharmaceutical Society of Great Britain was a voluntary institution, when any one could open shop for the sale of drugs and poison, and when the Pharmaceutical Conference had only existed two years, should certainly be true now, when the practice of pharmacy has become regulated by law, and is restricted to persons qualified by education and professional training. He says that every one will agree with Mr. Ince that "the first ethical rule of the pharmacist is the necessity of the absolutely genuine character of his drugs. No drug or remedy should be admitted into his shop other than that which, in case of dangerous illness, he would not hesitate to supply to the inmates of his own family circle." The second rule is, that the pharmacist degrades himself by the adoption of low and ruinous prices. Exorbitant prices are in no wise to be defended, but the guiding principle should be increased remuneration in proportion as the character of the articles make greater demands on professional education and skill. The abstract soundness of this view can scarcely be questioned, yet the gradual reduction in dispensing charges is the most deplorable factor of these later days. The very foundation of professional pharmacy is being gradually whittled away, and is being replaced by modern, so-called up-to-date business methods.

Speaking of advertising in its relation to pharmacy, Mr. Atkinson observes that while it is an incontrovertible fact that advertising is the mainspring of commercial activity, the advertisement of medicines and nostrums has an unenviable pre-eminence for qualities not very creditable. But it is a delicate subject, and the ethical attitude of pharmacists in regard to advertised nostrums is replete with difficulty. Many nostrums we recognize as useful and appropriate for the alleviation of the ailments they are recommended for; of others, we may be ignorant alike as to composition and effect; while of a third and extensive class, our intelligence assures us that they are hopeless frauds. The method of imposing on ignorance and credulity has been reduced to a fine art; and the public are induced to waste money and health on these wretched swindlers, and, paradoxical as it may seem, in the domain of medicine the ordinary medical man appears to be quite as gullible as the general run of humanity. It may be questioned, why discuss ethics if fierce commercial competition has virtually extinguished moral considerations in business affairs? Mr. Atkinson points out that history must be our guide. Above the cloud with its shadow is the star with its light. History has revealed to us that revolutions devour their own offspring, and science teaches us that the aggravation of a disease not infrequently evolves a remedy. A retrospective glance confirms him in an optimistic view of the future of pharmacy, and we have reason to believe that pharmacy is again approaching the threshold of a new epoch. The latest effort is to raise the educational standard; to raise the educational standard of any business or profession, must necessarily raise the status of the body corporate. Our hopes are centered in this upheaval; there is no more healthy force than vigorous, all-round culture; and as we expect to recruit our ranks in the future from a higher class, it is not unreasonable to expect a higher sense of conduct.

At an evening meeting of the Pharmaceutical Society in Edinburgh, during January of this year, Mr. David Storrar, taking Mr. Atkinson's paper, and through it the older paper of Mr. Ince, as his text, delivered an admirable address, which, while probably not bringing anything new, in the strict sense of the word, as he seems to fear, nevertheless presented the subject in a form which gives it the impress of originality. Moreover, it behooves us to remember that some topics that have been discussed and seemingly disposed of in the past, become new again as the occasion arises for their discussion, and that while in one direction we are continually learning, in the other we unlearn again with a like persistency. The existence of Mr. Ince's classical paper on "Pharmaceutical Ethics," for instance, well known and appreciated by the pharmacists of a generation ago, would probably have remained as a sealed book to the younger generation of pharmacists in Great Britain if Mr. Atkinson had not called attention to it; and similarly the American reader of this report—in the large majority—would have been ignorant of its existence if the reporter had not seen fit to use Mr Atkinson's excellent paper for the purpose of this introductory. It is practicable here to give only the salient points made by Mr. Storrar, who introduces his subject by the following definition of what constitutes pharmaceutical ethics—in so far as this can be differentiated from other ethics—which appeared in a leading article in the Pharmaceutical Journal in 1853. It says: "There are in all professions certain rules of conduct, understood if not actually agreed upon, among the members, a deviation from which is held to be unprofessional. These rules have no relation to the laws of the land; they constitute a voluntary or self-imposed restraint, having for its object the elevation of the tone and character of those under its influence, and the maintenance of harmony and good order in the profession. It is to such laws which the term ethics applies."

To discuss ethics with the man who has entered into business with the sole object of making money, is useless; for pharmacy, without some ulterior object that is incompatible with ethical considerations, is not a money-making profession. But while money-making should not be our sole aim in business, it is, and always must be, an important object. Rightly pursued, pharmacy is an honorable and useful calling, and the man who follows it conscientiously and makes it his pride to send out and dispense good, honest, pure drugs, is doing the world good service, and will continue to be recompensed for that service. To secure that recompense, however, a man must be true to himself; he must assert his right to be looked upon as something more than a tradesman, something more than a seller of patent medicines and perfumery; and in dispensing he must insist upon payment for something more than the value of what he weighs out and measures, namely, the skill and experience required in so doing, and he must do so not only for his own sake, but for the sake of the profession to which he belongs. Our first ethical duty then, *a duty to ourselves*, is to see that no individual action of ours will give away that position which has been secured to us.

Then, *we owe a duty to our fellow pharmacists*, which cannot be ignored without a violation of ethics. It is true that we are more or less at war with each other to secure public favor; but while we are, in this sense, at war, we have a bond of union which should be stronger than the force that keeps us apart, and it is only a truism that both upon the higher ground of fair and honorable dealing, as well as upon the lower ground of business policy, we should consider our neighbor's interest as well as our own. The question of prices, or rather uniform prices, is one that prominently obtrudes itself in this connection, but unfortunately is a most difficult one, since, as Mr. Ince has already pointed out, so much depends upon environment, which means the greatest possible difference in rents, rates and general expenses; the nature of the trade, whether cash or credit, and the class of customers, whether rich or poor, all of which makes it impossible to fix a hard and fast scale. But while under these varying conditions differences in prices must obtain, whether it be in selling drugs or in dispensing medicines, it is surely possible to fix at least a point below which a man should not go without being held as not only unjust to his neighbors, but to himself and his profession.

Another question is that of *mutual accommodation*, which should prevail among pharmacists not alone on ethical considerations, but on the ground of good business policy.

Next in order comes *our duty to the medical profession and the public*. In so far as our attitude to the medical profession is concerned, the duties are reciprocal—ours to dispense medicines, not to prescribe them; theirs to prescribe medicines, not to dispense them. It would be absurd, however, to interpret this rule too rigidly; to refuse to the pharmacist the privilege and the right to recommend simple remedies—known to every old wife in the country—for simple complaints, as it would be to prevent medical practitioners in the country districts dispensing their own prescriptions. Our duty to the medical profession and the public may be summed up briefly as follows: (1) that no drug or remedy be taken into stock or sold which is not absolutely genuine, and no preparation made or kept which is not prepared strictly according to the recognized standard; (2) that in dispensing the most rigid adherence be given to the directions of the prescriber; and (3) that no deviation be made from the prescriber's instructions without previous consultation with him—if that is at all possible—and without noting such alteration upon the prescription. To act strictly up to these rules becomes more difficult every day, on account of the ever-increasing number of special remedies which are being pressed upon the notice of medical men. But if it so happens that the pharmacist be called upon to dispense D's preparation, and he has only A's, B's and C's preparation of the same indicated composition in stock, the D added to the name of the preparation carries with it as much weight as the magic letters B. P.

Finally, we owe a duty to our trade associations, and this is by no means the least important, nor is it the easiest to fulfill. It is our duty, for instance, to love our neighbor, but it is difficult to do so when we see him only through the plate-glass windows of an opposition shop. We can become very different when we meet as fellow-members of a local association. We then find that our neighbor is something more than an opposition tradesman; he is a man, and as often as not a jolly good fellow as well. Let us cultivate the social element, therefore, as much as we can, as it breaks down the petty jealousy of each other, and that want of unity which has hitherto blockaded the way to all pharmaceutical progress as a trade or profession.

It may also be mentioned here that in an address delivered at the twenty-sixth annual meeting of the German Apothecaries' Association, at Strasburg, August 24, 1897, Professor E. Schaer discusses the question whether pharmacy in the past, present and future should be regarded as having essentially the more honorable character of a purely mercantile business, or to some extent, if not exclusively, as a scientific occupation, this question having within recent years become sufficiently actual and important to merit consideration. This question as to the character and position of pharmacy has in the past been a frequent subject of discussion, and competent authorities have always supported the view that it should rank as a scientific occupation, the rational exercise of which for the public benefit is inconceivable, unless those engaged in the practice of the art possess a manifold acquaintance with natural science. In that sense pharmacy is consequently entitled to be regarded as being a branch of applied science. These facts are so thoroughly recognized that the statement of them may appear commonplace and almost superfluous. But there is a logical consequence deducible from them: they at least justify the expectation that the pharmacist, after completing his education and entering upon the practice of his art with the consciousness that it has a scientific basis, will zealously apply himself, according to his means and abilities, to the advancement of those branches of science upon which the practice of his calling depends. A mere cursory retrospect of practical scientific pharmacy during the last hundred years suffices to recall to mind a numerous and respectable array of practical apothecaries who, in the midst of their business occupation, were also actively engaged in advancing those exclusively pharmaceutical branches of science—pharmacognosy and pharmaceutical chemistry; others, again, after continuing in the occupation of pharmacy, became inspired with a love of pure science, and followed the impulse of devoting themselves to chemistry, botany or biology as investigators and academic teachers. Prof. Schaer mentions a large number of pharmacists who have attained the highest distinction among both these classes, but regards the enumeration of the second class, the pharmacists who have become distinguished chemists and botanists, as being of less value in an argument as to the connection and reciprocity of pure science and pharmacy, than a conscientious and truthful survey of the pharmacists who have carried out scientific work, not after leaving their occupation, but while practically engaged as apothecaries, and have pursued one or the other of the sciences connected with their calling, with the result of advancing thereby their own investigation and observation. He mentions the more distinguished pharmacists and the work accomplished by them during the three hundred years preceding the beginning of the nineteenth century, and concludes that the facts recalled through this period speak for themselves so distinctly as to need no comment, but convey an eloquent and impressive exhortation to all of us who represent pharmacy, not to let the scientific art of pharmacy degenerate under adverse conditions of any kind, lest we choke a spring from which have flowed encouragement, and security for the pure sciences, aid both direct and indirect, and not unfrequently material support.

Botany as a Business Investment is the subject of a paper communicated to the "Pharm. Journ." (Sept. 11, 1897) by Mr. E. M. Holmes, Curator of the Pharmaceutical Society of Great Britain, who observes that the keen competition of the present day is gradually narrowing the circle of articles which can be sold by the chemist only, for other trades with more capital can sell many of the articles sold by the chemist at a lower price. But in those which require a knowledge of science and the art of pharmacy, he can, if he will, still find a chance of a livelihood, since in them he has fewer competitors. He therefore regards a thorough knowledge of botany as being by no means the least important of the pharmacist's accomplishments considered as a business investment, and he urges upon young men entering upon their apprenticeship to turn their leisure hours to account in order to acquire a comprehensive knowledge of this important subject. Thus the leisure hours during the interval between the lecture courses might be devoted to acquiring: 1. A knowledge of all the indigenous medicinal plants within reach, as well as any wild or cultivated plants known to be poisonous. The conditions of growth, time of flowering, character of the separate organs of the plants, &c., should be noted, and the knowledge of the parts and organs of plants thus gained will enable them to intelligently follow the lectures. 2. An elementary knowledge of histology should be acquired during these leisure hours, for it requires time to learn how to use the microscope properly, how to cut sections of plants for examination, and how to apply chemical reagents to distinguish the different tissues.

Having thus by persistent study become accomplished in a knowledge of botany, numerous avenues are open to him in which the pharmacist can exploit his knowledge for business purposes. It is a great help in cases of analysis, in which a histological knowledge of the structure of drugs enables him to give an expert's opinion. The field of bacteriology also is one well worth exploiting for business purposes; such knowledge may be turned to account, on behalf of medical men, in the examination of sputa for bacillus tuberculosis, etc., while a knowledge of the life history of ferments of the yeast class, or of the unorganized ferments of the diastase group, may prove remunerative in commercial and technical lines.

In harmony with this, in an admirable paper read at the eighteenth annual meeting of the Iowa Pharmaceutical Association, Professor Frank Hereth addressed the young men on the subject of *Pharmaceutical Education*. He says that in pharmacy, as in other scientific occupations requiring study, a man can become a thorough master of his art by self help, but he can make more rapid progress if he studies under the tutorship of competent teachers. Besides, there is much more incentive for study and retentive memory when the student is surrounded by many bright minds, eager to receive the honors of his class, or rival his classmates. During the course of study in a college, the student is given a broader view of science than he would otherwise have dreamed of. He learns that there is more in the realm of chemistry, in botany and in materia medica, than he can make use of in the store, and he sees in biology depths that, unfathomed, seek further information, and that may eventually beckon him to other fields than those originally alluring him. But having accomplished his education it becomes his privilege and duty to turn his knowledge into useful channels. He should not hesitate or neglect to cultivate the acquaintance and friendship of physicians; to call their attention to facilities possessed by him for pharmaceutical work; to impress them with his ability to carry out the chemical and microscopical tests that may be demanded of him, and to solicit their co-operation for all rightful purposes. In short, the young pharmacist having equipped himself mentally as thoroughly as possible—perhaps at some sacrifice—should take hold of his business with confidence, let his neighbors and competitors and the department stores take care of themselves, and expend his energies in building up his own, rather than in trying to lessen some other's business.

At the same meeting but in another vein, speaking of *Pharmaceutical Education, Past and Present*, Mr. H. W. Ballard observes that a pharmaceutical school or college was to the old pharmacists a luxury, or rather something that was entirely unnecessary. In fact it never entered their heads to go to school and *learn* pharmacy. Such a thing was hardly possible. Forty years ago a pharmaceutical graduate was a "rare article" and was classed as a "dude" of to-day. Under the new order the opportunities and requirements are very different. A pharmaceutical education (in Iowa) comprises: 1. Several years' experience in a good drug store in a city of over ten thousand. 2. Graduation from a good school of pharmacy. 3. Obtaining a State Board Certificate of Examination. It is true the neophyte in a pharmacy, as under the older conditions, must first wash windows, sweep out, wash show-cases, bottles, etc., run errands and make himself generally useful. But he is advanced more rapidly, learns how to do up packages neatly, soon is instructed in the proprieties to be observed when waiting on a customer, is made acquainted with the rudimentary work of compounding, and, after possibly two or three years, is ready to enter a school of pharmacy where, under modern methods of instruction, he acquires the theoretical knowledge and perfects the practical knowledge required for his graduation, as well as for his examination by the State Board of Pharmacy. This means a knowledge of chemistry, botany, and materia medica, of the art of compounding, of qualitative and quantitative analysis, of the use of the microscope, and of many other things not required under the older conditions.

"Compare this new method of becoming a pharmacist with the one of thirty or forty years ago, when a boy was kicked and pounded around, washed windows for four or five years, and his apprenticeship lasted for about ten years, on a poor salary. Pharmacists have many woes, but they certainly have a good opportunity to be educated, cheaply and thoroughly; and the standard for a pharmacist in the line of education should therefore not be placed too low, for there are already too many 'pseudo' pharmacists, *but not in Iowa*."

The Future of Pharmacy is the subject of several papers. At the nineteenth annual meeting of the New York State Pharmaceutical Association, Dr. Alfred B. Huested discussed the query, "Is the pharmacist of the future to be a mere store-keeper, or a skilled member of a profession?" He says, we are living in an age of change, new truths, inventions, discoveries and methods which make to-day as different from yesterday as light from darkness. These changes are more sudden now than at any previous period of the world's history. In everything change tends to disorder and confusion, and a view on the surface gives the impression that disintegration and destruction, rather than growth and development, are taking place. A survey of the past, than which there is no better way to understand the present, teaches that continual changes have been wrought among the three classes into which, under appropriate subdivision, human workers may be divided, viz., the teacher, the producer (manufacturer or agriculturist), and the merchant. The pharmacist has always been a worker in these three great classes—an educator or teacher in the line of medicinal and chemical research; a manufacturer in the production of remedial agents; and a merchant or trader in the sale of these products to those in want. A consideration of the changes that have been wrought leads him to the conclusion that the student, discoverer and inventor cannot thrive in the busy haunts of trade. The true professional pharmacist has, to a great extent, been driven from the care of pharmacies in public places to the laboratories of large manufactories, hospitals and schools. The retail pharmacist of to-day receives from these manufactories the great bulk of his stock in trade, and the physicians call for such directly in their prescriptions. The pharmacist of the future, however, will be what the pharmacist of to-day makes him — a merchant or trader, in proportion as he enlarges the variety of commodities in which he deals, or a professional man or educational man, in proportion as he reduces his variety, and endeavors to confine his efforts to the preparation, care and sale of such agents and work in such lines as are used in the cure of disease, the relief of the wounded, and which promote a knowledge of the laws of health.

Discussing the same query, though in a different view, Mr. S. H. Carragan points out the future of the pharmacist as follows: "The problem of the professional man is comparatively simple; he has only to study long and hard, prepare himself faithfully and then wait for employment. The druggist (pharmacist, Rep.), of the future will have to do this, *and more;* he will acquire competency in every branch of his occupation, and then, besides, he will everlastingly hustle for business, seeking the support of the physicians, catering to family trade, absorbing all the transient custom that can be made to come his way; scheming, advertising, pushing, and winning everybody's confidence by ability, by education, and by that rigid uprightness in dealing which is, after all, the biggest winner in the race for success.

Kindred subjects are discerned in numerous papers read at the Association meetings. In a paper entitled "The Trend of Pharmacy," read before the Massachusetts Pharmaceutical Association, Mr. W. F. Craig, reviewing the causes that have determined the changes in the character of the drug business during the past twenty years, changes which have amounted almost to revolution, maintains that one of the principal causes is the general apathy that prevails among pharmacists. The competency of the pharmacist is not questioned. There is not a more honorable class of men in any profession. Then why should the physician be particular to specify that his prescription be filled with the preparation of some firm that, for aught he knows, does not exist, in preference to one made in the laboratory of the pharmacist whom he meets every day, and whose competency and integrity are unquestioned. The fact is, the physician knows nothing of the laboratory of the pharmacist; he has never seen preparations of his manufacture; he thinks him a mere tradesman. With half the effort that has been made in the attempt to reclaim the patent medicine traffic, pharmacy can be placed upon a basis which will be a credit to the men who have devoted their lives and given their money to be properly fitted for the responsibility they have accepted. Outside of the U. S. P., the National Formulary affords a scope equal to the device of the most enthusiastic admirer of elegant chemical compounds. A majority of the physicians are entirely unfamiliar with this class of preparations. The physician, by constant touch with the work and progress of pharmacy, would soon realize the worth and recognize the merit of the true pharmacist, and legitimate pharmacy would soon attain here by merit the recognition that in other countries is accomplished only by legal discrimination.

Among the papers read at the meeting of the Indiana Pharmaceutical Association, that contributed by Prof. J. W. Sturmer, entitled "*The Proprietary Medicine Evil—What can be done to check it,*" elicited the most lively and interesting discussion. Professor Sturmer does not share the fears so pessimistically expressed by others that the occupation of scientific pharmacy will pass from the retail store, nor that the composite preparations now in vogue can be made better or even cheaper by the large manufacturers. But it will not do to fold our hands while our enemies are at work, our enemies being not the manufacturers of regular pharmaceutical preparations, nor the makers of "cure alls" for self-medication, but the makers of ready-made prescriptions—the anti-nephritic mixtures, anti-rheumatic syrups, antipyretic elixirs, and other conglomerations, against whom we should present a solid phalanx if we expect to preserve our scientific calling. It would be a serious mistake, however, if we tried to persuade physicians that they must give up ready-made composite medicines; these have come to stay, for the physician will not give them up. The question then narrows down to who is to furnish them—make them. Professor Sturmer is clearly of the opinion that it will be the pharmacists, if they will only make the right effort. We must take a lesson from these manufacturers themselves, whose most formidable weapon is the plea that the physician secures uniformity by prescribing their preparations, whereas composite preparations supplied under a given name by pharmacists differ in accordance with the notion of the individual making it. Uniformity in composite preparations of the same name can be got only by pharmacists recognizing some formulary as a standard, just as we recognize the Pharmacopœia, and this standard, in his opinion, should be the National Formulary. It is true that this formulary is not absolutely perfect; neither are Shakespeare's dramas, or Milton's immortal epics; and he submits that the object to be gained is so great that we can afford to sacrifice our pet formulas, even though they be better than the corresponding National Formulary formulas, a case which, however, does not occur very often. Then, having agreed upon a common standard, we can band together in our respective localities, and by properly presenting our claims to the physicians—who must be regarded as our friends and not our enemies—we can doubtless regain some of the territory we have lost. This is the experience in his own locality, where a campaign of education in this direction has been inaugurated with a success that has surpassed expectation, and there is no reason why the same should not hold true for other localities.

"*Make your own Preparations*," is a sermon which Mr. H. B. Gilpin, in his annual address as President of the Maryland Pharmaceutical Association, says has been often preached and so well that he hesitates saying anything upon the subject. Nevertheless he manages to say something on the subject in connection with the *cut-rate evil*, that is well worth the attention of pharmacists. He says, that in the sale of proprietary goods, retail druggists are acting as the representative of manufacturers, and if the latter wish to protect their agents, it would seem that they have it in their power to do so. The "cutter" thrives on his discounts. He buys goods in large quantities, obtaining special discounts, and is enabled to sell at retail for less money than the wholesale druggist pays wholesale, and make a profit. Retail druggists cannot cope with such a competitive condition. If manufacturers would make, as has been suggested, the conditions of purchase equal between retail druggist and "cutter," by refusing special discounts, fixing on an arbitrary "flat rate" for goods, without regard to quantity, the profitless competition that exists would be minimized, if not wholly checked, and retail druggists would receive some profit where at present they secure none. If the manufacturers are alive to their own interests, they must, in time, come to some such plan as this, and protect their agents in the sale of their goods. If they do not, their agents must protect themselves, and they are doing this already all through the land: by refusing to "push" the sale of proprietary goods on which there is no living profit; by using their knowledge of pharmacy to originate proprietary preparations of their own; by organizing co-operative manufacturing associations to secure the economies that come from manufacturing on a large scale. So far, manufacturers have failed to grasp their opportunities in this respect. Instead, they have pursued the policy of repelling rather than attracting, and in the public prints and elsewhere, have charged the retail druggists of the country with the high crime of "substitution;" the intent being to weaken public confidence in druggists, by insinuating that druggists who recommend their own preparations to the public instead of those of the larger manufacturer, must be dishonest in thought and action. Dishonest substitution consists in making imitations of certain manufactured products, and selling them to deceive the public. But he is perfectly justified, morally and legally, in giving his customers the benefit of his knowledge and experience when asked for, and, when asked, naturally recommends preparations about which he knows something rather than those of which he knows nothing. Such a course of action, moreover, is the logical result of the absence of protection on the part of the manufacturers of their agents. The path of safety for the retail druggist in the future lies in the developing and increasing of his knowledge of pharmacy and the allied sciences, in making his own preparations, and in "pushing them."

In line with these observations is a paper entitled "*A Business Remedy*," read by Mr. Oscar C. Dilly, at the meeting of the Kentucky Pharmaceutical Association, in 1897. Speaking of the business oppression experienced by the retail pharmacist, he expresses the opinion that in his own locality, as in others where similar conditions prevail, this depression had its inception in a cut in the profits occurring from the sale of patent medicines. Had the cutting in prices ended there, although the sale of patent medicines represents a large percentage of the present-day drug business, the situation would not be so serious; but one druggist after another seemingly finds it necessary, urged on by the thought that his cutting competitor is appropriating his custom, to offer first sundry articles, then staples, and finally prescriptions at cut-rate prices, with the result that only a few who succeed in doing an exceedingly large volume of business "make money," and the others, representing a large majority, by exercising the greatest economy, manage only to meet their expenses, some failing to do even that—truly a woeful depth for a high and honorable calling to fall to. As the trouble had its beginning in a cut on patent medicines, it is to that point the remedy must be applied. This consists in doing that which in time will force the manufacturer to protect the retail druggist from the cutter, a protection that amounts simply to keeping the manufactured product out of cut-rate stores. The manufacturer can give this protection and maintain it, if he really wants to, his many excuses and protestations to the contrary notwithstanding. But how is this force to be applied? Mr. Dilly suggests that every druggist enter the patent medicine business, and constitute himself a competitor of the manufacturer who will not provide the necessary protection. But such operation can only become formidable if the movement in this direction is general, not alone in a single State, but throughout the entire country. The remedies placed in competition must have merit, must be put up in good style, and sold at prices the same or somewhat below the cut-rate price at which regular patent medicines are offered. This can be done without resorting to the practice of substituting, or even recommending them as "just as good" as the regular line of patents when these are called for. A little judicious advertising has a wonderful effect in introducing and selling your own remedies, as is abundantly proven to Mr. Dilly by his own experience, and by the success of others of his acquaintance who have tried the plan.

"*The Greatest Curse of Pharmacy and Medicine*" is the title of a paper communicated by F. F. Ravenscroft to the Alabama Pharmaceutical Association, during its meeting in 1897. The curse is the so-called "Proprietary medicine," introduced, in most cases, by its manufacturers and vendors under a system that is misleading and false, as it is detrimental to the profession of pharmacy and of medicine; not the least pernicious result being the vast increase of self-medication by the general public. Instancing the various preparations of hypophosphites, he says that years ago a Parish and a Proctor instructed the world of pharmacy how to prepare these acceptably for medicinal application. Yet the proprietors of the preparations at present in vogue find no difficulty in convincing physicians that to prepare them properly methods must be pursued that are known only to them. And satisfied with this assurance, the physician prescribes the medicine, it becomes popularly known, and the public soon learn to ask for it without his prescription—the physician thus lending his aid in two directions, the one, in advertising a wonderful cure-all, and the other, in driving away his own patients. The medicated tablets are coming to the same thing. Said a traveling salesman the other day, when interrogated as to the future of the tablet business, "Why, after we get through working the doctors we expect to sell more tablets to the American people than all the doctors of the world have used up to date, because the doctors are teaching the people every day to use them, and the people will continue to use them without the aid of the physicians." This evil affects the pharmacist in more ways than one. He has to pay exorbitant prices for goods that are intrinsically of little value, and charge for them accordingly; he is robbed of his professional skill. And while it is conceded that the manufacturer of these compounds is entitled to a profit from his preparation, and that the conscientious pharmacist must and will supply them on prescription when obtainable, it behooves us to enter our protest and to exert ourselves to the utmost to guard and protect our highest and best interest and our professional character. Then, if we succeed, a new era of prosperity will dawn for both the pharmacist and the physician, and the public will also be largely the gainer.

In a paper read before the New York State Pharmaceutical Association, 1897, entitled "*The Druggist and the Department Store*," Dr. Albert H. Brundage, after clearly defining the gradual development of the Department store, observes that in the effort to absorb classes of goods, or lines of business less related to each other than those which had previously been associated, the druggist's wares were naturally not overlooked, and his business has ultimately been more or less incorporated into the vast mosaic, whose prime and far-reaching principle seems to have ever been monopoly. The small tradesman and the skilled artisan were apparently to be as far as possible engulfed, and business interests controlled by a fortunate few. The question arises, can the department store afford, for the mere purpose of attracting trade and consequent indirect profits, to provide a trained, skilled and licensed druggist, sell altogether reliable drugs, sell them in conformity with pharmacy laws, and for prices much below the retail druggist's profit? It would most decidedly seem not, and that the outcome must be low salaried and incompetent salesmen, or an adulteration and sophistication inimical to all dealers' interests and hazardous to the public. Drugs and medicines accidentally incorrectly labeled, medicines which increase in strength, or undergo some other important change on long standing, are, in the ignorant dealer's hands, a menace to the public health and life; and these conditions are not remedied by the department store employing a drug clerk who rarely buys and selects what he sells, and is invariably so situated as to be unable to satisfactorily investigate the character and reliability of the drugs and medicines he handles. The profession of pharmacy is replete with irksome exactions, and scarcely any compensating return. The pharmacist has in the past been so preyed upon by grievous legislation, by the competition of illegitimate rivals, and a most unreasonable popular misapprehension as to his financial returns, that his lot has been in many respects quite an unenviable one. He is, moreover, too much occupied with the exacting duties of his calling to resort to defensive commercial methods. He is too conservative and self-respecting to resort to retaliative measures; and he largely depends upon public recognition of his calling and appreciation of his required skill and training to protect him. Unfortunately, he has been most unwarrantably disappointed by the public, and it is only by his demanding strict and considerate legislative enactment that he may hope to secure the recognition and protection which are his due. To hasten that end, it is incumbent upon every druggist to associate himself with his fellows, help formulate the just claims of his profession, and intelligently co-operate with adopted measures, for "union will give him power."

That pharmacists are not a unit in deploring the modern methods of conducting the business, is voiced in the paper read by Mr. A. F. Menges at the meeting of the Wisconsin Pharmaceutical Association, in reply to the question, "*Has excessive competition introduced a 'cheap era' into the drug trade, and where will such tendency place pharmacy in the future?*" He points out that in all the branches of mercantile pursuit we find a restless energy, an endeavor to force trade, and that with the increase of population and wealth, many vocations have multiplied beyond reasonable proportion. In consequence all business has had to readjust itself to conform with the times, and in this process of evolution, which still goes on, the pharmacist is no exception. The small amount of capital required to establish a modern pharmacy, the ease with which his supplies are obtained from the manufacturer—saving an outlay for expensive apparatus and help—induces young men, as soon as they become well trained and equipped in their profession, to venture into the business for themselves. In consequence there is a multiplicity of stores, and this accounts for the varied stock that is found in the American pharmacy of to-day, for the sharp competition, and the "cheap era." But while his income may thus have been largely decimated, it is not believed that the pharmacist of to-day would like to return to what is so frequently termed "the good old times." Our position to-day is infinitely better than it was in those times, and who would wish to return to the latter and relinquish a pharmacy that has made such wonderful strides, with its more elegant medicines, its more enlightened service, its beautiful stores? Truly, pharmacy has made a wonderful change and onward march; and if these are our sentiments, what can be the opinion of the physician and the public?

But there are other papers to be found in the proceedings of the State Associations in which the writers do not hesitate to point out the failings and shortcomings of the pharmacists. Thus Mr. W. B. Thompson, in a paper read before the Pennsylvania Pharmaceutical Association, entitled, "A Pertinent Query," says, "How many pharmacists are there here who would be willing to give to others of us an invitation *carte blanche* to visit their establishments, and institute a scrutiny into shop-keeping, in all the details that pertain to the custody of drugs, medicines, utensils, appliances, etc.? What proportionate number could be subjected to a fair and reasonable test of examination, and show a creditable condition of care?" It is not meant to imply, however, that painstaking and caretaking are missing qualifications in the educational attainment of the average apothecary, or that he does not have a just conception of the necessity of scrupulously maintaining in his products the integrity and the official, as well as the standard character of all that he sends forth or dispenses. It is rather to call attention to the difficulties that beset the pharmacist, in face of the perishable nature and rapidly changeable character of much that he stands sponsor for; the ever-wearing elements of nature that are silently at work deteriorating his stock and material; the latent forces—temperature and light—and the air; the subtile and inevitable onslaught of chemical change; the insinuating ravages of the worm, and the disorganizing decay of vegetable substances. All these combine and conspire to make the pharmacist's life, his vocation, and his duty to conscience and client, such as devolves upon no other man, and his responsibility a heavy burden, which is not even lightened by a proper appreciation by the communities with which he is surrounded, either of the manifold requirements which invest the practice of his business, nor the amount of varied knowledge exacted in its pursuit. In a properly conducted pharmacy we must find evidence, as we pass from one familiar object to the other, that order reigns supreme; that there is method, scrutiny and oversight on all things; that thought, precaution, precision and exactness are axioms of daily practice. All this implies skill and accuracy and care, and where such evidences are wanting, we must conclude that he who has adopted pharmacy as a pursuit has failed to grasp a just idea of what it imposes.

At the same meeting, Mr. D. J. Thomas, in a paper entitled "*Conscience and Pharmacy*," calls attention to abuses that are laid to the door of the pharmacist, which, if the charge is well founded, would seem to justify the remark made sometimes in his presence, that a person could not be strictly honest and a pharmacist at the same time. It is charged that drugs that debauch and debase the better nature, such as emmenagogues, hypnotics, cocaine snuffs, alcohol, etc., are sold, and the sale encouraged, for a paltry profit to be gained; that prescriptions containing such, and other hurtful substances, are refilled and repeatedly refilled, without the written authority of the physician, and that poisons are promiscuously sold, without thorough and exhaustive inquiry as to their use. Placing in the hands of in-innocent and irresponsible persons drugs that enslave and render their victims a mental and moral wreck, if not absolute *murder*, is akin to being accessory to crime. It is doubtless true that many abuses find their way into pharmacy that are unworthy of the men engaged in this honorable calling; but so sweeping a charge is not with justice applied to the whole pharmaceutical fraternity because of the practice of an unscrupulous few. Pharmacy laws are enacted to bring about certain reforms—to elevate pharmacy to a higher plane and sphere; and, although the old story that there are millions in it is long since exploded, we can hand down to our posterity, if not a pecuniary heritage, an unsullied name.

A third paper pertinent to this subject, which was read by Mr. Clement B. Lowe, is particularly interesting to the younger members of our profession. It is entitled "*Rocks and Shoals of Pharmacy*," and briefly outlines some of the causes of failure to succeed in the exacting career of pharmacy. The first rock or shoal pointed out is a lack of, or perhaps in most cases a loss of, moral character; for it may be assumed that few young men start in life without a fair character. Starting out in his business career with ability and excellent prospects, the young pharmacist may, from the lack of moral stamina, become lax in his business methods after having done well for a number of years, resort to substitution and other dishonorable practices, and thus lose the ground he has gained. Or, his head turned by the prosperity met with, he may spend his time and money in disreputable society, and thus in a short time lose the respect and good will of his patrons. A second cause of disaster is insufficient capital coupled with extravagance in fitting up the store, the purchase of unnecessarily large quantities of stock, or of undesirable stock. Then, getting married without due consideration of the additional expense incurred by the matrimonial venture, sometimes proves a great drag upon success. Insufficient education, a lack of business system, carelessness in financial matters, a want of politeness, neglect of health—all are responsible for failure or success. With the elimination of these "Rocks and Shoals of Pharmacy," aided by judicious advertising, and keeping posted on what is going on in the business world, by consulting the most recent works, or the pharmaceutical journals, success can be achieved even in these days of sharp competition.

The difficulties to be encountered by the adoption of the "*Metric System of Weights and Measures*" has been the subject of several papers both in this country and in Great Britain. In a paper read at the meeting of the South Carolina Pharmaceutical Association, 1897, Mr. Robt. Stewart, Jr, presents some of the advantages of the system, as well as some of the difficulties in the way of its adoption by the pharmacist and physician. The advantages of the Metric System are the absolute relation between the units of weight and the units of measure, the simplicity of the divisions, and the brevity of expressing the divisions; the position of one figure to another determining its value, that on the left being ten times the value of the latter, while a figure on the right is one-tenth the value of that immediately before it. But it is just here where the danger arises in prescription work, since the accidental shifting of the position of a decimal point may be the cause of serious error. The Apothecaries' System, it is true, presents many incongruities, but the fact remains that our grains, drachms and ounces, with their well-marked characteristic signs, are far more distinctive and intelligible modes of quantitative expression than the French gramme with its deca, hecto and kilo multiples, and its deci, centi and milli fractions. Nevertheless, Mr. Stewart expresses himself strongly in favor of the adoption of the Metric System, and hopes to see the day when physicians shall protest against the old system, and shall insist on the use of the decimal subdivision and multiples, which are easily learned and remembered, and bring into use only the simplest arithmetical calculations.

In view of the fact that with the appearance of the long expected new edition of the British Pharmacopœia the metric or decimal system of weights and measures will become official in the realm of British Pharmacy, Dr. T. F. Dewar and James Jack, who have an abundant experience with the system as prescriber and dispenser respectively, have contributed a timely paper (Pharm. Jour., Dec. 18, 1897) in which they aim to present the elementary difficulties which have been felt and met with, or which may be expected to arise on making the change of systems. While the real value of the Metric System may be for a time hidden under a cloud of criticism, adverse and otherwise, ultimately it is sure to replace the present puzzling and cumbersome system, and will then become the recognized standard for Great Britain and of the civilized portion of Europe. It must be admitted, however, that the probability of the Metric System soon becoming general is becoming very doubtful. Medical men and chemists who have all their lives been accustomed to prescribe and dispense by drachms and grains will trust to the old system, using them through life's journey. We must therefore look to the younger men who take their place to see that education is advanced and bettered by adopting a system at once simple and comprehensive. Our Continental confreres find no insurmountable difficulties, and why should we fail to grasp the value of so many milligrammes, when we have done so with one-hundredth, one-sixtieth, and one-twelfth of a grain?

In a similar vein other writers have in numerous instances exploited the advantage of the Metric System and the difficulties to be encountered by its introduction into the British Pharmacopœia, and the pharmaceutical press has been teeming with editorials, suggestions and tables of equivalents, that cannot but familiarize the British pharmacist with the system, and prepare him for the change. The legalized use of the metric weights in British commerce, also, will have a tendency to familiarize the system among the people ; though, its use being simply permitted, it will probably be ignored in general trade so long as it is not compulsory. With the publication of the New British Pharmacopœia, the plea of unfamiliarity with the system can no longer be brought forward as an excuse by British pharmacists. But it is not alone the pharmacist that must awake to the importance of the Metric System. The trade has an equal, if not paramount interest in it. It is only very recently that the British Consul at Christiania, Mr. C. S. Dundas, in a report on the trade of Norway, emphatically stated that until British manufacturers and export merchants are content to put the weights and measures of their goods in accordance with the Metric System, they will always be at a disadvantage when dealing with foreigners. This seems to strike in the right direction, particularly in the case of our British cousins ; for once convince the British merchant and manufacturer that this system of measurement, heretofore ignored, is a necessary factor to their prosperity, and it will be quickly adopted and popularized.

In a recent editorial in the "Pharmaceutical Journal" (May 21, 1898), the question of popularizing the Metric System among the masses is carefully considered. It is mentioned that in most countries where the French Metric System is adopted it has been the practice to retain, to some extent, the use of the older denominations of weights and measures for particular metric weights and measures in common use. So in France the denomination "livre" is still understood to apply to half a kilogramme. A similar application of the familiar denominations of British weights and measures to the approximate metric equivalents would probably help to facilitate the adoption of the Metric System in Great Britain, and reduce very much the inconvenience attaching to the change from one system to another. The small difference between the half-kilogramme and the avoirdupois pound offers an opportunity for attempting an adaptation of that and other denominations to metric quantities, and the similar relation between the half litre and the imperial pint admits of denominations of measure of volume being adapted, in the same manner, to metric measures of approximate magnitude, so as to realize the special advantages of the French Metric System and of a decimal subdivision.

At best, however, the evolution from the older system to the new will make slow progress, our own experience bearing abundant testimony to that effect. Nevertheless, we have in our own country accomplished more than is popularly credited to us. The Pharmacopœia of 1880 paved the way to the introduction of the Metric System—to the exclusion of all others—into the Pharmacopœia of 1890. It has been a severe task to the older members of the profession to familiarize themselves with it; many of them have accomplished this, some have not, and others will not. But our young men have taken to it kindly, and it is safe to assume that ere another decade passes, familiarity with the terms of the Metric System of weights and measures will be the rule, and familiarity with the terms of the older system the exception.

The event of the year, however, is the appearance of the *New British Pharmacopœia*, which will be known as that of 1898, during the last few months. What has been done to perfect this work – in so far as a work of this kind can be said to be perfected—appears from an admirable review of its principal features in the "Pharmaceutical Journal" (April 9, 1898), from which the following remarks are mainly abstracted. At no time since the appearance of the British Pharmacopœia, in 1864, has so much interest been taken in the national medicine-book as now in anticipation of the issue of a new edition. There are three paramount reasons why pharmacists should feel a deeper interest than usual in the new volume: (1) because, excepting the Addendum in 1890, this is the first time they have been asked as a body to co-operate officially with the General Medical Council; (2) because it has been generally understood that an attempt was being made to express the formulæ in the metric system of weights and measures; and (3) because there have been good grounds for believing that the new edition would be an "Imperial" British Pharmacopœia. The labor which has been expended upon it justifies the world of pharmacy in entertaining great hopes of its scientific and literary accuracy, and of its usefulness. Committees the world round have debated upon it and made their recommendations. Through the Colonial Office, the General Medical Council received reports and recommendations from every dependency of the British Empire, from the Bahamas through the long list, to Zululand. In Great Britain and Ireland the same assistance was given by each and every College of Physicians and Surgeons, by all the Universities, by the Medical and Pharmaceutical Associations, and it is impossible to estimate, even approximately, the number of persons who have directly, to a greater or lesser extent, contributed to the compilation of the British Pharmacopœia of 1898. They would form not an inconsiderable army. In the single item of statistics, to enable the intelligent elimination or retention of the medicaments heretofore embodied in the Pharmacopœia, there were over 5,000 lists received by the Therapeutic and the Pharmaceutical Committees, the more immediate work of digesting, assimilating, and forming into a coherent whole of the great mass of statistical and scientific work having been done by a Committee of the Medical Council, while the editing was done by Professor John Attfield. But whether the result will justify this immense amount of labor, time alone can determine; for many of the changes are so momentous, that practical and experimental examinations are demanded before they may be either commended or condemned. What some of these changes are may be briefly outlined here. To those who expected the new work to assume the character of an "Imperial" British Pharmacopœia, it must be a disappointment. There is no evidence of it in increased volume, there being only 535 pages as against 536 in the 1885 edition, in which only 34 pages were devoted to the index, whereas in the 1898 edition there are 91 pages absorbed by it. Neither is it apparent in the body of the work. There are few explanatory words in the preface, and one and one-fifth page in an appendix, under the caption "Alternative Preparations Sanctioned for the Use in India and the Colonies:" the proportions of lard, suet and wax may be varied in ointments to suit climatic conditions, more alcohol may be used in the liquid extracts if required, more or less bees' wax may be used in making suppositories, aromatic water may be made with essential oils, dried lemon peel may be substituted when fresh is not obtainable—that is practically all.

The eliminations far exceed the additions, which consist of only seventy-nine drugs and preparations, whereas one hundred and eighty-nine, among them a large number of galenical preparations, viz.: 4 confections, 10 decoctions, 3 plasters, 17 extracts, 7 infusions, 15 solutions, 3 pills, 3 syrups, 11 tinctures, 7 ointments and 3 wines, have been dropped; as are also all cataplasms, essences, vapors and suppositories containing soap.

It was hoped, at least on this side of the Atlantic, that the Metric System of weights and measures would be adopted in the new Pharmacopœia, to the exclusion of the Imperial system. This is not the case. The Metric System has simply been added, and quantities are given in both systems, thus:

	Imperial.	Metric.
Benzoic acid	180 grains.	20.6 grammes.
Oil of anise	1 fluid drachm.	6.25 cubic centimeters.

But this applies only to preparations, and the metric quantities do not necessarily correspond—as will be observed in the example quoted—to the imperial quantities, which may be designed to form an imperial pint of the preparation, whilst the metric quantities apply to 1000 Cc. This is an incongruity, which will doubtless give rise to considerable trouble, the only safeguard being the absolute adherence throughout to the imperial quantities or to the metric quantities given in a formula, as may be selected. All the quantitative tests, however, are described in terms of the Metric System alone.

Considerable changes have been made in the nomenclature of drugs and preparations; but only a few chemicals have been so treated, and then always in the direction of greater accuracy. From the paragraphs describing crude drugs, the botanical and zoölogical synonyms have been deleted. The botanical nomenclature follows that of the "Index Cewensis," except in a very few instances. The "Characters and Tests" of the drugs have been well revised, although in many paragraphs there is a solid substratum of the 1885 edition. In the nomenclature of chemicals, the English names are brought, on the whole, into line with text-book chemistry, but the familiar Latin names have been retained because of a disposition not to worry the prescriber too much by change. The paragraphs dealing with the processes of manufacture are very considerably condensed, and are so framed as to leave the particular process optional. The recognition tests, and the tests for all common impurities, instead of being repeated in the various paragraphs, are consigned to an appendix, with the result that a great amount of space is saved; but what the result will be in practice, remains for future development. In carrying out volumetric determinations, the pharmacist will have to rely, in most cases, upon his own judgment in the choice of indicators, some help being offered in the explanatory notes found in the appendix under the caption "Volumetric Estimations."

The standardization of galenical preparations has also not been augmented to the extent anticipated, the only addition being certain preparations of belladonna and ipecac. The assay processes for cinchona and opium have been revised, and an important improvement has been made in the standardization of the preparations of nux vomica, the starting point being a liquid extract instead of the solid extract. The valuation of pepsin is to be conducted on the same lines as those laid down in the United States Pharmacopœia, artificial digestion being prolonged for six hours.

Among matters of minor importance, it may be stated that six different strengths of alcohol are official, which are distinguished by the percentage by volume of absolute alcohol, namely, absolute alcohol, alcohol (90 per cent.), alcohol (70 per cent.), alcohol (60 per cent.), alcohol (45 per cent.), and alcohol (20 per cent.). The matter of doses has received attention, and the dosage of galenical preparations has been greatly simplified, the strength of some of the preparations having been altered so that it became possible to arrange them, according to the dose, in sections.

A novel feature, finally, is the index, which is evidently intended to be an epitome of the Pharmacopœia for the use of prescribers. It consists of four columns, with the headings, "Name," "Page," "Dose," "Strength." It is implied in the preface, that the lists of the preparations into which official articles entered, had been substantially incorporated in the index, and in the beginning of the index the further statement is made that every important preparation of a drug would be found under the English name of a drug. The index does not accord with this pretension, and is, in fact, in respect to the number of items and their arrangement, to all intents and purposes the same as in the Pharmacopœia of 1885.

In subsequent comments on the new British Pharmacopœia, the journal already quoted says, that the changes made in the official formulæ are enormous, only a small minority of the existing preparations remaining unaffected, whilst there is good reason for believing that a very large proportion of the alterations are hardly required. Apparently, the chief object in view has been to meet the medical practitioner's convenience in minimizing the tax on his memory. A sense of irritation will doubtless affect many pharmacists when they note how heedless and puerile many of these alterations are, and it will be difficult to avoid confessing that the revisers have missed a magnificent opportunity. Concerning the adoption of both the Imperial and Metric Systems of Weights and Measures, it is held that a great lack of judgment has been shown. If there be any good and sufficient reason for postponing the adoption of the Metric System in its entirety in the British Pharmacopœia, there can at least be no possible objection to the use of "parts" and "fluid parts." If that plan had been resorted to, either Imperial or Metric weights and measures could have been employed without any confusion; but that is more than can be said of the arrangement actually adopted.

In this connection it is of interest that in a lecture delivered before the Manchester Therapeutical Society, speaking of the forthcoming New British Pharmacopœia, Dr. A. T. Wilkinson observes that it would be an advantage to the medical profession if there were three recognized books, revised at stated intervals by competent authorities: First, an "Extra Pharmacopœia," in which proposed new remedies could be included until they acquired established reputation; second, the "British Pharmacopœia," containing none but well authenticated remedies; and third, a sort of "Index Expurgatorius" or list of medicaments that have been tried and found wanting. At the same time, he thinks, as a book, the Pharmacopœia is surely unique; for "everybody professes acquaintance with it, hardly anybody possesses it, and the bulk of its preparations are rarely if ever used." He is of the opinion that the Pharmacopœia should be purged of some of its redundancies, and that some radical changes should be effected in its constitution; for though the work has been much modified in the course of years, it still needs considerable reconstruction before it can be said to match modern medicine. The medical practitioner of to-day considers it is a matter of duty to present medicines to patients, and especially to children, in the least objectionable form. He quotes the success of some proprietary remedies in support of his views, and pleads that, if such medicines are not to be prescribed by the profession, it ought to be possible to present the drugs in equally palatable form, but prepared according to official formulas. The "Pharmaceutical Journal," commenting upon Dr. Wilkinson's lecture, observes that the main point to be noted is that a representative medical practitioner considers that, if the Pharmacopœia "descended a step or two further from its throne," it would not be thought less dignified, nor would the profession disdain to be taught.

In our own country, the preparation for a revision of the United States Pharmacopœia goes on in its even tenor, unostentatiously, and yet with the certainty that a new Committee of Revision, when entering upon its duties, shall have much of its work outlined and prepared for immediate use. The wisdom of maintaining the Committee of Revision and its organization intact during the intervals between the decennial revisions, by authority and instruction to fill vacancies as they may occur, and the publication of the Pharmacopœia by the Committee itself, instead of farming out the privilege to some publishing firm, has been confirmed by the advantageous conditions under which the work can now be done. With an abundant fund for the purpose, research committees, and experts employed by them, have been continually engaged in confirming or revising previous investigations, correcting formulas, processes and tests, and in devising new ones; while, with the literature of the world at command, and under the masterly leadership of Dr. Charles Rice, the committee has drawn in the world's scientists as contributors to the work of revision.

Proceedings of the State Pharmaceutical Associations.

(During the Year 1897.)

In conformity with the practice of the past two years, a review of the transactions of the State Pharmaceutical Associations whose printed proceedings have reached the reporter is given in the following. As heretofore, the proceedings were not received from nearly one-half of the State Pharmaceutical Associations, and owing to this omission could not be reviewed. But believing that the omission to supply the reporter with these proceedings is accidental, and not intentional, a list of the Associations whose transactions have not been received is here appended, as follows:

Arkansas.
California.
Colorado.
Connecticut.
Delaware.
Georgia.
Louisiana.
Mississippi.
Montana.
New Mexico.
North Carolina.
Oklahoma.
Oregon.
Rhode Island.
South Dakota.
Utah.
Vermont.

In the present review, the reporter has aimed to give as complete an "epitome" of the transactions of the Associations as was possible within reasonable limits. He has in this particular materially augmented his review of the presidential addresses, condensing the topics discussed as nearly as possible in the language of the author of the address, but not hesitating to change the original sequence of the topics under discussion, and to clothe them in appropriate and equivalent phrases whenever this was deemed necessary to illuminate salient points. As in the previous reports, this review only gives the titles of the papers read at the annual meetings. Some of these papers have already been reported upon in the "Introductory"; others have been abstracted, and will be found under proper headings in the body of this report.

Alabama.—The sixteenth annual meeting of the Alabama Pharmaceutical Association was held at Selma, May 11th and 12th, 1897, in three sessions. The president, Mr. W. F. Dent, in his annual address calls attention to the extension of the Pharmacy Law to towns of 500 inhabitants, but regrets that the Legislature, while adopting all the other amendments asked for by the Association, did not also adopt that requiring annual registration by the registered pharmacists of the State. He deplores that the druggists of Alabama should be so sparsely represented in number, and urges that some plan may be devised whereby the praiseworthy efforts of the Secretary of the Association to increase the membership may be more efficiently aided. Besides the usual reports, a number of papers were read and discussed during the sessions, their titles being as follows:

"Tincture of Iodine," by Albert E. Brown.

"The Greatest Curse of Pharmacy and Medicine," by F. F. Ravenscroft.

"On the Necessity or Propriety of Returning Original Prescriptions on Demand," by W. F. Punch.

"Is Tablet-Making Practicable in Retail Stores?" by Jas. W. Milner.

"Tasteless Quinine Preparations," by Stanton Brigham.

"A Psychological Study of Plants," by E. T. Mitchell.

Illinois.—The eighteenth annual meeting of the Illinois Pharmaceutical Association was held at Champaign, June 2d and 3d, 1897. Four sessions were held. In his address the President, Mr. W. K. Forsyth, calls attention to the importance of continued efforts to counteract the cut-rate evil. Among the measures that are likely to assist in this direction, the support by the druggists of the State of some co-operative manufacturing company, such as the United States Pharmacal Company, for instance, which has members in Missouri, Iowa, Indiana, California, and other States, may prove of great service in combating the evil, as may efforts of the Association to secure legislative enactments restricting the department stores. Concerning the legislation and examination of pharmacists, he calls attention to the preponderance in the number of registered pharmacists in the United States over assistants, there being, according to the last reports at the close of 1895, 60,000 of the former to 10,000 of the latter. He believes that the registrations of the latter class might be increased, by making the assistants' examinations more elementary, designed rather to discover to what extent the candidate is grounded in the sciences and physical operations embraced by his profession, than as to his qualifications to compound and dispense medicine; while, on the other hand, the examinations of pharmacists should be extended, more time should be devoted to the examinations, the theoretical examinations should cover more ground, and the practical examinations be more thorough and complete. The provision for the registration of apprentices in the present law of Illinois he regards as a step in the right direction, since it is through the education attained by our youth that our professional status as pharmacists must be determined.

Besides the routine reports, several reports were read that were of special interest. The report of the Committee on Legislation contained a number of recommendations which elicited considerable discussion, the remarks of Professor Hallberg being so elaborate as to partake of the nature of an address. The report of the Committee on the Revision of the United States Pharmacopœia, also, is replete with admirable suggestions, which will doubtless prove of value to the National Committee of Revision. An interesting report was also received from the Committee on Unofficial Formulas. The following papers were read and discussed:

"Emergencies, How to Treat Them," by W. H. Garrison.

"An Examination of Some Chemicals of Commerce," by W. A. Puckner.

"A Microscopic Examination of Some Powdered Drugs of the Market," contributed by the Microscopic Laboratory of the School of Pharmacy of the University of Illinois.

Indiana.—The sixteenth annual meeting of the Indiana Pharmaceutical Association was held at Indianapolis, June 1 and 2, 1897, four sessions being held. In his address, the President, W. O. Gross, congratulated the Association on the progress made and particularly on the wonderful increase in membership during the past twelve months, a result which he believes is largely due to the prominence given to subjects connected with trade interests. He points out the advantages to be derived from local associations, making it possible to establish closer relations between pharmacists and physicians, as exemplified by the practice prevailing in the Retail Druggists' Association of Fort Wayne, where joint meetings of members of both professions are held for the purpose of reading and discussing papers from both sides. This has not alone been productive of more friendly relations between the professions, but has resulted in awakening a healthy interest in the preparations of the U. S. Pharmacopœia and of the National Formulary in preference to many of the so-called semi-proprietary medicines. He deplores that the efforts made by the pharmacists of the state should again have failed to secure the long-coveted prize of a pharmacy law, but insists that the defeats which have been measured out biennially serve to show the weak points in the proposed law, and should be an incentive to renewed efforts with the greater care and prudence taught by experience. Besides reports of a routine character, reports were received from the Committee on Education, the Committee of Trade Interests, the Committee on Pharmacy Law, and Standing Committee on Legislation, which were discussed under their merits. During the second session, also, an interesting discussion on "Formaldehyde," introduced by Prof. J. N. Hurty, was participated in by many of the members present, and this constitutes not the least important part of the proceedings of the Association. The following papers were read and discussed:

"Druggists as Advertisers," by D. H. Lohman.

"The Proprietary Medicine Evil—What Can be Done to Check It?" by Prof. J. W. Sturmer.

Indian Territory.—The third annual meeting of the Indian Territory Pharmaceutical Association was held at South McAlister, May 20, 1897. The President, Mr. L. L. Moore, in his address expresses great satisfaction at the progress made by the Association, which, beginning with a small band of twelve, now numbers something like seventy members on its roll, a large number of whom are of the best qualified pharmacists in the Territory. He thinks, however, that admission to membership should be made more easy, and that the present plan of examination as a requirement for admission should be so changed that the membership might be increased. His remarks are replete with good suggestions, and speak well for pharmacy in the Indian Territory. While only one session was held, it is gratifying to note the interest which is manifested by the members in the affairs of pharmacy in the territory, no less than seven papers having been read at this meeting, their titles being as follows:

"The Pharmacist," by Henry Searls.

"Adulterations, and How we are to Detect Them," by H. H. Hokey.

"To What Extent Should Pharmacists do their Own Manufacturing?" by H. D. Knisely.

"Tinctures," by W. O. Trott.

"How to Successfully Conduct a Drug Store," by P. E. Coyne.

"How to Make a Drug Store Pay," by J. C. Johnson.

"The Best Method of Advertising Your Business, and to What Extent," by H. D. Knisely.

Iowa.—The eighteenth annual meeting of the Iowa Pharmaceutical Association was held at Waterloo, June 9, 10 and 11, in three sessions. In his annual address the President, Mr. E. M. Burns, congratulates the Association on its prosperity and on the interest manifested by the members in the meetings; gives some wholesome advice on the conduct of the retail drug business, and the attitude of the pharmacist towards the physician and the public; calls attention to the desirability for the discussion and report of the same subjects of general scope by the different state associations, and speaks a good word for the National Association, to which important questions might be profitably referred for discussion by the State Association. Professor Frank Hereth, of Illinois, delivered an admirable address, in which he extolled the advantages of a good pharmaceutical education, believing such to be very far-reaching in remedying some of the unsatisfactory conditions under which pharmacists now labor. Several interesting reports were also received and discussed; among them attention may be particularly called to that of the Committee on Trade Interests and to that of the Committee on Pharmacy, the latter embracing a unique contribution by Mr. E. S. Ballord, in which he mentions some eighty or more drugs and medicinal articles observed by him on a single lot—his home—in the city of Davenport. The number of papers read largely exceeded the number of their titles, there being in most cases several on the same subject. They were as follows:

"Is it Advisable to Prepare Tinctures from Fluid Extracts?" by C. Schadt.

"The Coming Woman" (3 papers), by Florence Gratiot Bale, by Mrs. Fletcher Howard, and by Mrs. M. J. O'Keefe.

"Best Method of Becoming a Successful Druggist" (4 papers), by Milo W. Ward, by J. W. Ballard, by Mrs. W. G. Bale, and by J. C. Nietzsche.

"Pharmaceutical Education" (2 papers), by H. W. Ballard and by J. M. Henry.

"Relation of Druggist to Physician" (3 papers), by J. M. Henry, by C. D. Chase, and by W. G. Bale.

"Business Associations—Their Workings and Accomplishments," by John Jones.

"Five and Ten Cent Articles—Is it Advisable for Druggists to Encourage Them?" by T. H. Kenefick.

Kansas.—The eighteenth annual meeting of the Kansas Pharmaceutical Association was held at Junction City, May 25, 26 and 27, 1897, in three sessions. The President, Mr. W. J. Evans, in his address deals largely with questions concerning trade interests. He suggests the advisability of appointing a committee to compile a schedule of retail prices, which is to be incorporated in the Proceedings of the Association, and also distributed to the registered pharmacists of the State with the recommendation that they be adhered to as closely as local conditions will permit. Concerning the charge of substitution by the pharmacists of the State, he feels convinced that it is not practiced to anything like the extent that some manufacturers would make us believe. Among the more important reports received at this meeting, those on School of Pharmacy, on Adulteration, and on Pharmacy and New Remedies, deserve special mention. The following papers were read:

"Successful Advertising," by M. S. Ingalls.

"How Can the Retail Drug Trade be Made More Profitable?" by Chas. Lawrence.

"On Salicylic Acid and Calcium Sulfite as Preservative of Cider," by E. H. S. Bailey and Chas. M. Palmer.

"Columbian Spirits," by E. L. Sayre.

"What Line of Trade Can be Successfully and Profitably Combined with the Retail Drug Business?" by W. S. Sears.

"On Acetanilid in Phenacetin," by George Wagner.

"Pharmacy Laws," by Wm. V. Ingham.

"Some Kansas Mineral Waters," by H. E. Davies.

"An Experiment in Repercolation," by D. Clark Kelly.

"The Influence of Temperature on Percolation," by George B. Norris.

"Home Paint," by L. D. McKee.

"Calomel in Tablets: Does it Decompose into Corrosive Sublimate on Standing?" by Ernest L. Ozias.

Kentucky.—The twentieth annual meeting of the Kentucky Pharmaceutical Association was held at Crittenden Springs, June 15th, 16th and 17th, 1897, in four sessions. In his annual address the President, Mr. R. M. McFarland, after expressing his satisfaction at the increase in membership as well as on the financial condition of the Association, called attention to the draft of a new pharmacy law by the Legislation Committee, which contemplates the extension of the law to every pharmacy in the State, wheresoever situated. Referring to the proposition that a table of average doses of official drugs should be introduced in the next Pharmacopœia, and to the propriety of introducing trade-marked synthetic remedies into that standard, he expresses himself decidedly in opposition to both propositions. He also bespeaks for the American Pharmaceutical Association a greater interest by the members of the Kentucky Association, believing that closer affiliation with the National Association will not alone inure to their benefit individually, but will tend to advance the status of pharmacy throughout the State.

Among the special reports made at this meeting that of the Committee on Interchange of Ideas, etc., deserves more than passing mention. Actuated by the idea that many topics of general interest are annually brought up and discussed by all of them, the Committee recommend the creation of a Standing Committee, whose duty it shall be to correspond with all the State Associations for the purpose of informing them of any action taken by the Association upon topics of general interest, or that may come up for discussion at the annual meetings. They suggest, also, that the utility of such a Committee might be further increased by conference with similar Committees of the other Associations, such conference to be held by delegation at a convenient time during the meetings of the American Pharmaceutical Association. It is believed that in this way united action can be had upon important subjects that are now lost sight of for the want of uniform disposition.*

Another important report was that of the Committee on Legislation. The draft of the proposed law was thoroughly discussed, taken up by sections, amended in some important particulars, and as finally adopted has, with slight modifications, become the law of the State. The chairman of the committee, in connection with his report, takes occasion to call attention to the National Formulary, and invites the pharmacists of the State not only to make the preparations of that standard, but to suggest formulas for such preparations as are in demand and not contained in the Formulary. He presents a formula for "Elixir Terpin Hydrate and Codeia," which see under "Pharmacy."

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* Such a Committee has been appointed, but, owing to a misunderstanding, has failed to enter upon its duties in time for the meetings of 1898.

The following papers were read:

"A Business Remedy," by O. C. Dilly.

"A Posse ad Esse—The Remedy," by G. A. Zwick.

"The Druggist as Merchant," by Vernon Driskell.

Maine.—The eighth annual meeting of the Maine Pharmaceutical Association was held at Long Island, Portland Harbor, July 6 and 8, 1897. In his annual address the president, Mr. Geo. W. Dorr, congratulated the Association on the passage of a new pharmacy law, which, though not by any means perfect, is a vast improvement upon the old law. He deplores the existence of the cut-rate evil, and contends that the cutting is far worse than the department store, since the latter only does the cutting on a small line, whereas the druggist does so on a full assortment of proprietary goods. While the membership of the Association includes about one-third of the druggists of the State, he can see no reason why *all* should not be members. He is a firm believer in local, State and National associations, and is convinced that if there was ever a time when it was for the interest of the pharmacists to hold together and work shoulder to shoulder, it is now. Speaking of the American Pharmaceutical Association, he advises that every live pharmacist should become a member and attend its meetings. The most important report at this meeting was that of the Commission of Pharmacy. There were no papers read at this meeting, but the discussions on various topics were interesting, and were participated in by a number of visiting members from other State Associations.

Maryland.—The fifteenth annual meeting of the Maryland State Pharmaceutical Association, was held at Ocean City, July 14, 15 and 16, 1897. Speaking in his annual address of the necessity for continued effort to secure a pharmacy law for the entire State, the president, Mr. H. B. Gilpin, impresses upon the members the fact that pharmacy laws are enacted not for the especial benefit of pharmacists, but primarly for the benefit and protection of the public. Incidentally, it betters the service to the public and, improving the condition of those who practice it, betters the interests of pharmacy. He therefore advises that the members requesting certain pharmaceutical legislation, should impress upon the legislature the fact that they are *not* acting as pharmacists, but as citizens of the great Commonwealth of Maryland, anxious for the health and lives of the people. He urges the member, to fight for a State law and to fight for the right kind. Another subject that cannot be urged too strongly upon the legislature is a repeal of the law which forces the retail and wholesale druggists of city and State to pay a saloon license. If it is essential to tax the sale of liquors for the sick, or more accurately to tax the sick for needing liquors, make a special tax for pharmacists. Do not place them in the same category with saloon-keepers. Mr. Gilpin makes some wholesome remarks on the cut-rate evil and the consequent demoralization in the retail business, and points out that the question as it now confronts the pharmacist, may in time redound to the benefit of pharmacy. The watchword is "Organization," and increased activity on the part of every member must result in a stronger organization. Get together and act for the common weal, and the result cannot help but induce great good to every interest concerned. Among the more interesting reports presented at this meeting were the report of the Commissioners of Pharmacy and Practical Chemistry, 1897, by Dr. D. M. R. Culbreth, President of the Board of Pharmacy, and a report on the Progress of Pharmacy during the year 1896–1897, by Dr. A. R. L. Dohme—a number of improved formulas for various pharmaceutical preparations, Elixirs, Syrups, Mixtures, Salves, &c., being presented in the latter for endorsement or criticism, and will be found in the body of this report under their respective headings. The following papers were read:

"An Ancient Commissioner's Dream," by H. P. Hynson.

"Salol-Coated Pills," by R. P. Hayden.

"The Poetry of Botany," by Dr. A. W. Miller.

The last-named paper, which was read by Dr. Miller—a delegate from the Pennsylvania Pharmaceutical Association—by request, deserves wider circulation than seems assured by its publication in the proceedings of a State Association. It was not alone entertaining, but bore the impress of the high culture of its author, who traces the influence which botany has exerted from the earliest ages and among all nations upon the poetical aspirations and the religious cravings of man.

Massachusetts.—The sixteenth annual meeting of the Massachusetts State Pharmaceutical Association was held at Plymouth, June 8, 9 and 10, 1897, in four sessions. The President, Mr. Wm. F. Sawyer, in his annual address, confined his remarks very briefly to legislation and educational matters, urging upon the members that they should, through the influence of the Association, strive to promote the educational and commercial interests of pharmacy, in all progressive laws, in looking after the welfare of the trade, and especially in protecting pharmacy from all unjust laws.

An important report was received from the Committee on Legislation, embodying the draft of a dangerous and pernicious bill which had been introduced into the Legislature, the passage of which, by the energetic protests and efforts of the Committee, was fortunately prevented.

The report of the Committee on Adulteration gives a very large list of drugs and chemicals which have been found to vary from standard strength and purity during the year past.

The following papers were read:

"Trade Variations of a Few Drugs, and How to Distinguish Them," by Charles F. Nixon.

"About Pills," by E. H. La Pierre.

"Prescribing Ready-Made Preparations," by Max. Cramer.

"The Trend of Pharmacy," by W. F. Craig.

"Laboratory Notes Concerning Various Preparations," by Professor Scoville.

"On Trade Interests," by N. W. Stiles.

Michigan.—The fifteenth annual meeting of the Michigan State Pharmaceutical Association was held at Grand Ledge, August 3, 4 and 5, 1897, in five sessions. The President, Mr. E. F. Phillips, in his annual address, reviews the status of pharmacy in the State. He observes that, with the dispensing of medicines by physicians, the cutting of prices, the cry of substitution, and the sale to the cutter by jobbers, the slang expression, "Where are we at?" echoes about the only description of the situation to be given, and that it is much easier to mention the various phases of our situation than it is to suggest successful treatment. Among the remedies suggested, the fields of bacteriology, physiological chemistry and microscopy may be exploited with advantage and profit by the pharmacist. For the "merchant druggist," as many side-lines as space and capital will permit are advocated. In his attitude to the general public, the putting up and recommendation by suitable advertisement, sample or otherwise, of his own household remedies by the pharmacist, is recommended as being the kind of substitution which he would consider legitimate.

Concerning the continued struggle to secure the general adoption of the Metric System of weights and measures, he expresses the opinion that the Association should take sides in the matter, and place itself on record as favoring this step forward in universal progress. He also calls attention to the advantages of membership in the American Pharmaceutical Association, and holds it to be a duty which the pharmacists of the State owe themselves, to join that Association, and to attend its meetings if possible. Moreover, the annual Proceedings will keep them posted in all things pertaining to "up-to-date" pharmacy.

Among important reports received, that from the Committee of Trade Interests deserves special mention.

The following papers were read:

"Sale of Poisons and Registration Thereof," by Albert B. Prescott.

"A Plan to Stop Price-Cutting in the Drug Trade," by A. B. Stevens.

"Diastasic Ferments," by C. C. Sherrard and J. L. Tegarden.

Minnesota.—The thirteenth annual meeting of the Minnesota State Pharmaceutical Association was held at Lake Park Hotel, Lake Minnetonka, August 23 and 24, 1897, in four sessions. Mr. Edward C. Dorr, in his address as President to the Association, expressed in behalf of its members the gratification felt that the meeting of the National Association should be held at nearly the same time and place. He refers to the satisfactory character of the legislative enactments that have been passed, and urges that by continued effort the power of the ignorant be in every way limited. He calls attention with pride to the Department of Pharmacy of the University of Minnesota, and as a subject of congratulation, a second child of the Association, the Minnesota Pharmaceutical Manufacturing Company, which has done much to relieve the pharmacists of Minnesota of the burden imposed by the practice of manufacturers in supplying the department and other stores, selling at prices that are unsatisfactory and almost ruinous to pharmacists. And, as "in union there is strength," he urges upon every member of the Association to make earnest and constant effort to increase its membership. The report of the Committee on Adulteration shows the condition of samples of tincture of nux vomica, Hoffman's anodyne, spirit of camphor, oil of sweet almond, chlorinated lime, and tincture of opium, found in the market.

A paper was read by Mr. H. G. Webster, in which he reviews the work and needs of the State Board of Pharmacy, and Prof. F. J. Wulling delivered a masterly address in which he outlines the aims, objects and conduct of the College of Pharmacy of the University of Minnesota, while in a concluding paper he continues his Historical Sketch of this college, the initial chapter of which was given in 1895 and continued in 1896.

Missouri.—The nineteenth annual meeting of the Missouri Pharmaceutical Association was held at Meramee Highlands, June 8, 9, 10, 11 and 12, 1897, in seven sessions. In his address the President, Mr. Eugene Soper, speaks with pride of the Missouri Association as being the largest of the State Associations, but deplores the evidence of indifference to the business of the Association, as shown by the attendance at the business sessions during the past two or three years. The condition of the drug business throughout our country he regards as being in anything but a flourishing condition, and he therefore urges upon the members that, whereas "in union there is strength," the only way out of the present difficulties is to band together and to strike a blow at the cause wherever and whenever practicable. He recommends among other measures the support of the Association of the United States Pharmacal Company of Chicago and St. Louis, and that the members should unite in making and advocating the use by physicians of the preparations of the National Formulary. Concerning the Metric System of weights and measures he expresses himself as being opposed to its adoption; he can see no use for a change, regards it as being impracticable and un-American, and believes that the best interests will be served by retaining the system under which we have gotten along so well in the past.?! It may be remarked, however, that from this view the Association very promptly dissented, by adopting the following paragraphs of a report on the president's address:

"The President's strictures on the Metric System we think should not stand as the sentiment of this Association." "It is a system which, when in use, becomes second nature in practice, just as much as the weights and measures now in use by us, which are absolutely without system." "The generation which takes it up in school days and absorbs it, will find it as simple as the Arabic notation of numbers or the United States currency of the dollars, dimes, cents and mills. This cannot be called un-American. The Association, therefore, cannot afford to endorse the President's position on this subject,"

The report of the Committae on Drug Adulteration, by Wm. K. Ilhardt, Chairman, very ably presents the conditions of inferiority found in the case of a number of drugs, chemicals and pharmaceutical preparations, the results of the examination of Liquor Potassii Arsenitis, Acidum Arsenosum, Liquor Ferri Chloridi, Chloroformum, Potassii Iodidum, Potassii Bitartras, Syrupus Acidi Hydriodici, Potassii et Sodii Tartras, Sodii Nitris, Copaiba, Potassii Bromidum, Tinctura Opii and Spiritus Aetheris Nitrosi being exhibited in tabulated statements. Quite a number of papers were read, under the following titles:

"A Pleasant Laxative,"—three papers—by G. H. C. Klie, by H. F. Hassebrock, and by R. S. Vitt.

"The Present State of Our Profession in St. Louis," by Albert H. Koch.

"Commercial Calcium Hypophosphites," by R. S. Vitt.

"Report on the Use of the Metric System in Prescriptions," by Dr. H. M. Whelpley.

"Home Manufacturing"—two papers—by H. F. Hassebrock and by Otto F. Claus.

"Glycerin," by J. M. Good.

"The Quality of Quinine Sulphate," by Francis Hemm.

"Chemically Pure Acids," by Ambrose Mueller.

"Pharmaceutical Chips," by C. E. Corcoran.

"Commercial Powdered Opium," by Wm. K. Ilhardt.

"The Preparation of Benzoinated Lard," by Francis Hemm.

"About Fishing," by C. E. Corcoran.

"A So-called Tasteless Quinine," by G. H. C. Klie.

"Commercial Quinine Sulphate," by A. Brandenberger.

Nebraska.—The sixteenth annual meeting of the Nebraska Pharmaceutical Association was held at Plattsmouth, June 7, 8 and 9, 1897, in three sessions. The President, Mr. J. J. Tetan, devotes a large part of his address to a discussion of the evils resulting from the flood of proprietary remedial agents with which the professions of medicine and pharmacy are incumbered in recent years, as well as the patent medicine evil, and makes some wholesome suggestions calculated to secure their abatement. In connection with the whole subject, however, he makes the following remarkable statement, which is given verbatim, but would find no place here if, when the opportunity was offered, he had fittingly retracted it. He says:

"From all I have been able to glean, the American Pharmaceutical Association at present is in complete control of the large manufacturers, but for the sake of appearance they have placed the offices in the hands of men of world-wide reputation in pharmacy, but when it comes to business they are the ones who reap the benefit. Such a state of affairs should not exist."

The Committee to whom this address was referred made a brief report, in which, concurring with the many timely suggestions embodied in the address, they say:

"We note the reference to 'Ownership by Manufacturers of the American Pharmaceutical Association.' Considering the very high character of this Association throughout the country, we can hardly understand just what could have been meant by this, and think a charge so serious should be amplified somewhat and made more specific."

And, after remarks by a number of members, who were a unit in upholding the integrity of the American Pharmaceutical Association, this report was received and approved.

At an evening meeting, held June 8, Prof. Joseph P. Remington delivered an address on the subject "The Pharmacist, Physician and Prescription," followed by a stereopticon exhibition by the professor, illustrating some glaring imperfections, absurdity or illegality in prescription writing.

The only paper read at the meeting was one entitled, "A Trip through Mexico," by H. H. Barth.

New Hampshire.—The twenty-fourth annual meeting of the New Hampshire Pharmaceutical Association was held at Manchester, September 7 and 8, 1897, in three sessions. The President, Mr. Charles B. Spofford, in his annual address, alluded to the general depression of business and spoke of a proposed pharmacy bill, introduced by certain individuals, as being inimical to the best interests of the profession, and that its defeat was therefore a matter for congratulation. He congratulates the Association on having secured a reprint of the Proceedings of the early meetings covering nearly one hundred and seventy pages, whereby the Proceedings of the first years of its existence are now preserved in permanent form. The meeting of the coming year, being the silver anniversary of the Association, will, he hopes, be the occasion of more than usual observances, and to this end he recommended the appointment of a committee to take charge of the matter, and that efforts will be made to secure a large attendance. Among the more important reports are those of the Commission of Pharmacy and of the Board of Pharmacy, both for the year ending October, 1897. Two papers were read at this meeting, both by Charles A. Tufts, the one entitled "The Word 'Apothecary,'" the other "Preliminary Education for an Apothecary."

New Jersey.—The twenty-seventh annual meeting of the New Jersey

Pharmaceutical Association was held at Princeton, May 5 and 6, 1897, in three sessions. In his address the president, Mr. H. O. Ryerson, explained the reason for non-action on the proposition of the Pharmaceutical Association, of Washington, D. C., that the Association should place itself on record as favoring free alcohol. He congratulated the Association on its comfortable position financially, but raised a warning voice against extravagance, and expressed the hope that the members would not look upon the neat bank balance as a thing to be speedily gotten rid of. Brief allusion is made to the satisfactory work done by the Legislative Committee and by the Committee on Membership, but considerable space is devoted to the work done by the Board of Pharmacy, whose personnel is entirely new. Criticisms, complaints and protests have come to his knowledge. In his capacity as the executive officer of the Association, he has had every opportunity to inspect their manner of working, and it affords him great pleasure to give expression to his conviction that the members of the Board of Pharmacy have fulfilled the trust placed upon them both faithfully and well. He speaks at some length on the subject of trade interests, the relation between pharmacists and physicians, and upon the claims of superiority of manufactured products over those made by the pharmacists in a small way. The reports presented are mainly of a routine character. The following papers were read :

"Preparations of Rose," by William C. Alpers.

"Blue Weed," by August Dresher.

"The Relation of Boards of Pharmacy to Their State Association," by William C. Alpers.

"On the American Pharmaceutical Association," by Geo. W. Parisen.

New York.—The nineteenth annual meeting of the New York State Pharmaceutical Association was held at Manhattan Beach, July 13, 14, 15, and 16, 1897, in eight sessions. The president, Mr. Robert K. Smithers, commended in his address the active co-operation of local pharmaceutical organizations with the work of the State Association, the most effective work having been done in the section of the State where such existed. The principal topics discussed were the efforts made to secure one law, one Board of Pharmacy for the State, co-operative manufacturing, patented and copyrighted preparations, and the department store. Concerning legislation, he observes that the enactment of the Greater New York charter, placing New York and Kings counties under one law and one Board of Pharmacy, is considered by some as a step towards complete unification. There is undoubtedly a sentiment throughout the State for a uniform pharmacy law, and he advises that the draft of a suitable law—the essential features of which, as they occur to him, are outlined very explicitly—be placed in charge of a legislative committee for the ensuing year, to secure enactments. In regard to co-operative manufacturing, he says that the plan advanced by the Erie County Pharmaceutical Association has resulted in the formation by the retail druggists of the State of a company with a very complete equipment.

Though originally operated on the very restricted plan of selling shares of stock only to licensed retail pharmacists of the State, and goods only to such shareholders, this restriction has now been removed, so that shares and goods may be sold to retail druggists outside the State. Of foreign patented and copyrighted preparations, he says that it is a rank injustice to the sick and suffering of the American people, that certain chemical products, which are but the natural evolution of the chemistry of the age, should be sold at wholesale in the United States under the "protection" of our patent and copyright laws, at the arbitrary and fictitious prices which are demanded for them, and which are, in some instances, thirty or forty times the expense of manufacture. He recommends that the delegates to the American Pharmaceutical Association urge upon that body to memorialize Congress to so amend our patent and copyright laws that these foreign manufacturers be accorded no greater advantages in this country than they are allowed in their own. He further recommends that the Committee on Commercial Interests of the New York State Pharmaceutical Association make an effort to enlist the representatives in Congress from the State of New York in the cause, and that this Committee also take steps to ascertain, upon reliable information, whether these articles can be legally imported, duty paid, and sold under their descriptive chemical names.

In connection with the department store question, he observes that it is fortunate for the pharmacists that theirs is not the only line affected, since the department octopus has reached out and grasped with a death-grip almost every branch of trade. While, therefore, the ignorant and needy may still believe, in spite of protestations to the contrary, that there is a profit still at cut rates, there is reason to believe that the more intelligent of the people recognize that the methods of the department store constitute one of the most potent factors in withholding the wealth of the country from circulation among the masses, in making the rich richer, and the poor poorer, and in creating hard times, poverty and distress in a country that abounds with plenty.

Among the important reports received were those of the Committee on Legislation and of the Board of Pharmacy, and "On New Remedies," the latter giving in alphabetical arrangement the titles of over eighty preparations, together with their supposed composition and reputed medicinal value. The titles of the papers read at this meeting were as follows:

"The Druggist and the Department Store," by Albert H. Brundage.

"The Pharmacist and the Microscope," by Henry Kraemer.

"Some Instances of the Practical Value of the Microscope in Pharmacy," by A. P. Lohness.

"Interchange of Registration Certificates," by Willis G. Gregory.

"Renewal of Registration," by Willis G. Gregory.
"The Future of Pharmacy," by Alfred B. Huested.
"Trade or Profession," by S. H. Carragan.
"How to Increase Interest in the Association," by Edward A. Sayre.
"A New Variety of Wood Alcohol," by Willis G. Gregory.
"Experiments with Cascara Sagrada," by Luther F. Stevens.
"How to Thicken Your Prescription Files," by R. F. Tompson.
"Antidotes for Poisons," compiled by Thomas J. Keenan.

North Dakota.—The twelfth annual meeting of the North Dakota State Pharmaceutical Association was held at Fargo, August 24th, 1897, in two sessions. In his annual address, the President, Mr. E. C. Lucas, urges upon the members the importance of better attendance at the annual meetings of the Association, whose membership is sufficiently large, and that they can only hope to accomplish something of mutual benefit by active co-operation and personal interchange of ideas. Much good can also in this way be done towards remedying the unsatisfactory business relations that now prevail, the pharmaceutic specialty, proprietary medicine, and cut-rate evil. He also bespeaks the active support, by the members of the Association, of the American Pharmaceutical Association, and calls attention to the fact that the present meeting will be in session only one day, so that the members may have an opportunity of attending the meeting of the National Association at Lake Minnetonka on the day following. There were no papers on scientific subjects presented at this meeting.

Ohio.—The nineteenth annual meeting of the Ohio State Pharmaceutical Association was held at Cleveland, June 8–11, 1897, in four sessions. In his annual address the President, Mr. J. A. Mayer, suggests that the Association give greater attention to the evils engendered by the cutting in prices, and recommends that every city and county in the State form local associations and maintain them. Interesting reports were received from the following committees: On Pharmacy Law; Pharmaceutical Education; on Adulteration and Sophistication; and on Papers and Queries—the latter embodying brief replies to some queries propounded at the meeting in 1896.

Pennsylvania.—The twentieth annual meeting of the Pennsylvania Pharmaceutical Association was held at Delaware Water Gap, June 22, 23 and 24, 1897, in four sessions. In his annual address the President, Mr. Joseph P. Remington, felicitously reviews the object of the annual gatherings of the pharmacists of the State. A successful meeting must depend upon a due consideration of all of its objects—whether these be scientific, educational, or merely social. A proper proportion of each of these elements is just as necessary for a pharmaceutical meeting as it is to make an emulsion or a compatible solution. The very fact of yielding to one's natural tastes and entering into fields and pastures new has a reviving effect upon the self-centered, active and over-worked specialist. Let us then recognize the value of the broadening influences that are at work in our State Pharmaceutical Associations throughout the land, and by entering into those subjects which most interest our fellows, without neglecting our own specialties, we shall realize the full value of united effort. He calls attention to the subjects that will come up for consideration at the meeting, and culling largely from the reports of the various committees, briefly alludes to the unsatisfactory condition of business, and points with pride to the satisfactory relations existing between the Association and the State Medical Society, which is largely due to the settled purpose inaugurated by the Association a decade ago, of inducing the physicians of the State to use exclusively in their practice medicines of known composition. This reform was effectively inaugurated a number of years ago by a provision in the by-laws of the State Medical Society, excluding secret preparations from their exhibitions, and much progress has been made in late years in the work of encouraging harmonious relations between physicians and pharmacists. Among the more important reports of committees presented and discussed at this meeting, the following may be mentioned: On Free Alcohol, on Legislation, and on Botany; the last named giving a practically complete enumeration of plants and trees of Pennsylvania, in accordance with the arrangement of natural orders of Engler and Prantl, and the nomenclature of the American Academy of Science, known as the Rochester code. The following papers were read:

"Notes on Opium Assaying," by Frank X. Moerk.

"Analytical Processes and Laboratory Notes," by C. H. La Wall.

"Chlorinated Lime in Zinc Containers," by W. B. Thompson.

"Cold Cream," by F. W. E. Stedem.

"Rocks and Shoals of Pharmacy," by Clement B. Lowe.

"Conscience and Pharmacy," by D. J. Thomas.

"Should Drug Store Experience in Pharmaceutical Education Precede or Follow a Collegiate Training?" by Theodore Campbell.

"Should Druggists Study Medicine?" by Dr. W. H. Reed.

"A Pertinent Query," by W. B. Thompson.

"The Secret of a Successful Man's Success," by Joseph W. England.

"Flora of Bushkill Falls," by Adolph W. Miller.

The last named paper, important in itself, becomes additionally so in connection with the before-noted report of the Committee on Botany.

South Carolina.—The twenty-first annual meeting of the Pharmaceutical Association of the State of South Carolina was held in Charleston, December 14 and 15, 1897, having been adjourned to these dates at a meeting held on November 18, 1897, in conformity with the resolution at the annual meeting in 1896. Several sessions were held, two of them being devoted to the business of the Association, the reading of papers, etc., the other to prize contests and other entertainments. The annual address of the President, Mr. O. E. Thomas, was devoted mainly to the Pharmacy Law of the State. This appears to be menaced by a bill before the Legislature, the passage of which will permit any physician to obtain a license without examination and conduct pharmacies anywhere in the State. It therefore behooves every member of the Association to be on the alert, and to exert his influence with the members of the Legislature to prevent the passage of this measure, lest the law retrograde to its position previous to 1894. In addition to routine reports, the following papers were read:

"The Advantage of a Knowledge of Botany in the Study of Materia Medica," by T. Robertson.

"Is it Well to Know All?" by L. G. Wood.

"The Metric System," by Robert Stewart, Jr.

Tennessee.—The twelfth annual meeting of the Tennessee Druggists' Association was held at Nashville, July 21 and 22, 1897, in three sessions. In his annual address the president, Mr. G. C. Childress, briefly reviews the progress of pharmacy since the last meeting, and expresses confidence, in view of the better feeling that prevails among the agricultural classes, in a brighter future, the more particularly since there is evidence that, in spite of the hard times, cut-rate stores, and poor collections, the druggists of Tennessee have managed to maintain their financial standing. He commends the endeavor made by the pharmacists of the country to improve the status of pharmacy in the Army, Navy and Marine Hospital service; deplores the evident tendency to abolish practical experience as a pre-requisite to graduation in our Colleges of Pharmacy; expresses his conviction that the retail druggist will not be benefited by the removal of the tax from alcohol used in the arts and manufacture, though in favor of such removal if in practice the druggist of small capital and limited use is placed on the same footing as the wealthy and powerful manufacturers; and he deprecates the growing discrimination in favor of the products of foreign manufacturers of chemicals over similar products of American laboratories, the sentiment in favor of foreign chemicals and medicines over American products being largely due to the skillfully worded literature disseminated by the New York representatives of the foreign manufacturers. He congratulates the pharmacists of Tennessee on the marked success in their efforts to improve the Pharmacy Law, which by recent legislative enactments has been so extended as to cover any incorporated town in the State and has been otherwise improved, particularly in the direction of regulating the rules of poisons, which, hitherto, have been so recklessly abused throughout the State. He speaks favorably with regard to reciprocity or interchange of certificates of registration between the several states, if it can be done on an equitable basis, and sees no reason why such an exchange would not result in gathering together the pharmacists of the country, and in bringing about social relations and a uniform standard of professional standing and recognition. Finally, he invites the attention of his associates to the importance of joining the National Association, the annual proceedings of which as published being well worth the expense of membership, while at the meetings its members are in touch with the brightest intellects known in any profession. The reports at this meeting were of a routine character, and included a voluminous and explicit report of the Tennessee Board of Pharmacy. The following papers were read:

"Should Dosage be Introduced into the United States Pharmacopœia. Reasons for and Against," by A. B. Rains.

"The Effect of Citrates, Tartrates, Glycerin, Sugar and Acacia on some Common Chemical Reactions," by E. A. Ruddiman.

"Are the Tests in the U. S. P. too Stringent to Allow that Book to be taken as a Standard in cases of Legal Proceedings?" by G. C. Childress.

Texas.—The annual meeting of the Texas Pharmaceutical Association was held at Galveston, May 18, 19 and 20, 1897, in four sessions. In his annual address, the president, Mr. H. L. Carleton, gives expression to the disappointment which must be shared by the members, that the pharmacy bill proposed at the last meeting has failed of enactment by the legislature. He points with satisfaction to the good work that is done by the school of pharmacy connected with the medical branch of the State University, which, under the influence of the present corps of able instructors, has greatly promoted the higher education of the pharmacists of the State. The one objection that appears to be well founded is that diplomas of the school are granted without the pre-requisite of practical experience; but this does not in the least detract from the value of the systematic training to be obtained in the school; and as the faculty maintains, the fault is not theirs if the pharmacists do not avail themselves of the opportunities offered. Speaking of commercial interests, he touches upon the question of "free alcohol," which personally he regards as a menace to the welfare of the retail druggists, who, being unable to comply with the proposed onerous conditions, are placed at the mercy of the large manufacturer. He also alludes to the recent introduction of a very pure *methyl* alcohol as a substitute for ethyl alcohol, which may prove useful for many purposes, but he sounds a note of warning against its indiscriminate use for preparing a line of pharmaceuticals—tinctures, fluid extracts, etc.—as is proposed by its introducers. He congratulates the members on the happy adjustment of the strained relations existing between some of them at the date of the last meeting, the element of contention, "cut prices," having been happily buried. Besides the usual routine reports, reports were received from the Committee on Adulteration, and from a Special Committee on Medical Conference. It is mentioned in the last-named report that the committee asked the Texas State Medical Association for an expression on a number of queries concerning the extent to which preference is given in prescriptions for official and unofficial remedies; if the latter, whether the preference is for the preparation of some known manufacturer, or for those of their local druggist; to what extent the preparations of the National Formulary are used or endorsed, etc. Though these queries were promptly referred to a special committee by the Medical Association, the result of their consideration was not received in time to be reported at the present meeting. In closing their report, the committee recommend that the pharmacists should continue to take pride in their profession, make their pharmacy a systematic study for improvements, and, whatever other lines may be carried, give special attention to the prescription department. This should be a department to itself, clearly defined, well appointed and attractive to the physician. The pharmacist should be courteous and inviting, show himself to be sensible and practical, and claim the patronage and co-operation of the physician only upon the ground of actual merit. There were no scientific papers presented at this meeting.

Virginia.—The sixteenth annual meeting of the Virginia Pharmaceutical Association was held at Charlottesville, July 20th, 21st and 22d, 1897, in five sessions. In his annual address the President, Mr. James L. Avis, invites thoughtful attention to the extensive and increasing use of proprietary and semi-proprietary remedies. This is not by any means the least of the innumerable trials with which the retail druggist of to-day is beset. Manufacturers, jobbers, patent medicine people, and the public, are using him to their advantage and his own disadvantage; but it is impossible to overestimate the burden and injustice that is heaped upon him by the practice of physicians to prescribe these proprietary articles, and it is a great surprise that the younger men in the profession, who are recent graduates of our best medical schools, do not use their brains and the instruction they have received, and write prescriptions to fit their patients, instead of making their patients fit the ready-made remedy. The practice of underselling and the attitude of the retail druggist to the "cutter" is considered at some length. Perhaps in lowering the price the quality has also been materially lowered; and this, with the tricks of the department stores and the enterprising county merchant has forced upon the trade a reign of low prices, which, if persisted in, must result disastrously to all. As regards the cutter, he insists that it is unjust to judge his action until we are in possession of all the facts that led him to pursue such a course. A man's right to manage his own business as his judgment may dictate is inherent, and cannot be disputed. If, therefore, there exists any feeling of resentment or distrust towards the cutter, let us lay it aside for the present at least, unite cordially, discuss the situation earnestly and sensibly, and arrive at an intelligent and concerted action that will do away with the necessity for such an evil. Towards this and other desirable ends, it is absolutely necessary that the retail druggists of Virginia combine and build up this Association. The Association, in its turn, should foster and encourage the organization of local Associations. Through perfect organization the druggists of the State can make themselves felt in the interest both of their professional and commercial advancement, make a deeper and more lasting impression upon the Legislative Assembly, and secure that reform in the pharmacy law of the State, and in its execution, that will secure its enforcement and respect for its provisions. Permanent good can result only through the perfect organization of the State and local organizations. An interesting report was read from the Committee on Adulteration, showing the commercial condition of Copaiba, Spirit of Camphor, Tincture of Ginger, Baking Powder, Distilled Extract of Witch Hazel, Iodoform Gauze, Sulphurous Acid, Quinine Sulphate, Bismuth Subnitrate, and Beef, Iron and Wine. The following papers were also read:

"Percolation," by C. B. Fleet.

"Microscopy for the Pharmacist," by M. D. Hoge, Jr.

"Why a Clerk should be a Member of the State Pharmaceutical Association, and the Advantages Thereof," by T. H. Brenniman.

"The Condition of the Retail Drug Business and the Remedy," two papers, by Fred. M. Wills and by R. W. Powers.

"As Others See Us," by Morris P. Gould.

"Our Native Medicinal Plants," by George E. Barksdale.

"Laboratory Notes," by George E. Barksdale.

Washington.—The eighth annual meeting of the Washington State Pharmaceutical Association was held at Seattle, September 20, 21 and 22, 1897, in four sessions. The President, Mr. Joseph Schlumpf, directed attention in his annual address to the failure of enactment of a new pharmacy law. He expresses the firm belief that a new law—one that is just and reasonable—will receive favorable consideration and will be enacted, if only the pharmacists of the State will take united steps to secure that desired end. Success can only be attained by working for it. Attend the meetings of the Association, take an active interest, and above all, do not wait until your neighbor asks you for your support. During the past few years, owing to the hard times, it has been a hard task on some and an impossibility to other members to attend the meetings; but if the greater portion of the Association believe the Pharmacy Law, as it now stands, to be a failure, the members should come to these meetings and help correct it. Reports, other than of a mere routine character, were received from the Committee on Legislation and from the Board of Pharmacy; and a paper was read by Dr. E. Bolink, entitled "Dishonesty of Druggists," in which he gives the pro and con of the periodical attacks upon the integrity and dishonesty of druggists as a class—a paper which offers much food for reflection and will prove interesting reading to pharmacists everywhere.

Wisconsin.—The seventeenth annual meeting of the Wisconsin Pharmaceutical Association was held at Green Bay, August 10, 11, and 12, 1897, in five sessions. The President, Mr. Joseph Hammel, calls attention in his annual address to the growth of the Association during the past year, in spite of the hard times. It is the experience of all of us, that our business needs professional training and the utmost skill, and were it not for Associations such as ours, constantly striving to elevate the business and its members, and have laws passed for the protection of the people, there is no telling where we might drift. Let us continue to impress those in our line of business that *our work* is *their work*, and, therefore, that it is their duty to join us, help us to improve our business, and receive the benefits arising from united action. He calls attention to the efficient work of the Committee on Legislation in securing proper legislation, and in defeating the enactment of improper measures; to the satisfactory relation that appears to exist between the physicians and pharmacists of Wisconsin, and to the beneficent results occurring from the establishment upon a sound foundation of the Wisconsin Pharmacal Company, which secures the means of getting back that trade that has been drifting away, and puts good goods upon the market, which will probably soon be found in every pharmacy of the State. An important result is that there is no longer so much cutting in prices. Speaking of the usefulness of the meetings to the members in attendance, he expresses the conviction that their best interest will be served by discussing those things that are of interest to the trade, rather than in the discussion of formulas and scientific questions, and that the Association can be made more useful by giving special attention to trade topics.

Reports were received from the following committees: On Trade Interests, on Wisconsin Pharmacal Company, on Adulteration, on Legislation, and on National Legislation.

The following papers were read:

"Substitution," by Henry Rollman.

"Physician vs. Patient," by R. Sauerhering.

"Why so Large a Proportion of the Pharmacists of Wisconsin are not Members of the Pharmaceutical Association," by Carl G. Buchta.

"To what Extent is Substitution Practiced by the Pharmacists?" by A. A. Pardee.

"Has Excessive Competition Introduced a 'Cheap Era' into the Drug Trade, and Where will such Tendency Place Pharmacy in the Future in its Relation to the Physician and the Public?" by A. F. Menges.

"What Must We do to Make the Soda Fountain Pay?" by Chas. A. Wakeman.

"Is it Safe to Drink, allow Drink, or Dispense Liquors behind the Prescription Case?" by G. G. Popp.

"The Quality of Oil of Peppermint in the Market," by Carl G. Hunkel.

"Gelatin Suppositories are Again Coming into Use. Give Formula for a Good Mass to Prepare Same," by L. A. Le Mieux.

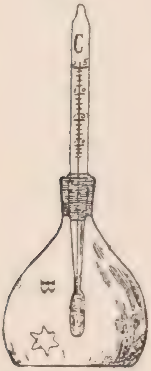
"Report on the School of Pharmacy," by Edward Kremers.

PHARMACY.

APPARATUS AND MANIPULATIONS.

A New Hydrostatic Balance—Description.—Dr. B. H. Gerland describes a new hydrostatic balance, the beam of which has two knife-edges of steel working on agate planes, the end one being placed parallel with the central knife-edge. The divisions are sharply cut and the riders have a V-shaped edge, so that they necessarily fall into their true position without loss of time. The horizontal arm of the stand carries a circular spirit-level, in addition to a divided arc, and two leveling screws in the feet serve to adjust the position. The end knife-edge supports a stirrup suspender with an agate plane, to which the platinum wire of the sinker is hooked. An instrument provided with a Reimann's sinker, displacing 5 Gm. of water at 15.6° C., works accurately to the fourth decimal.—Pharm. Journ., Feb. 26, 1898, 186; from Journ. Soc. Chem. Ind., xvii., 13.

FIG. 1.

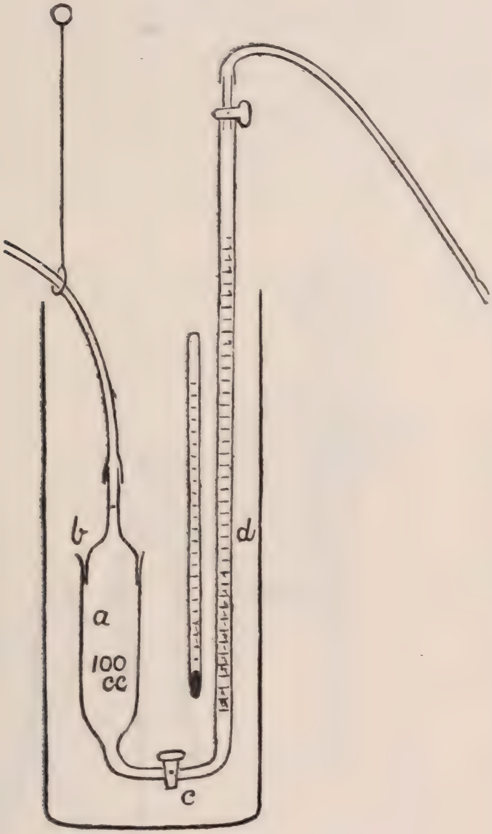


Specific Gravity Bottle.

Specific Gravity Bottle—Improvement.—C. E. Muller, London, constructs the specific gravity bottle shown by Fig. 1, which contains a simple and ingenious addition to ensure the thorough mixing of the contents, and therefore a uniform temperature throughout the liquid. This is effected by means of a small glass grenade bulb, *B*, which, on rotating the bottle, promotes the thorough stirring of the liquid. The bottle, as will be noticed, is also provided with a thermometer as a stopper.—Pharm. Journ., May 28, 1898, 521.

Volumeter—Convenient Construction.—Professor W. R. Hodgkinson has devised the volumeter shown by Fig. 2. It was constructed from the absorption tube of an Orsat-Muencke's gas-analysis apparatus, which had broken at the bend, and an ordinary 50 Cc. burette, the two being joined by sealing a short stop-cock (*c*) between. Any convenient liquid may be used for a relative weight or specific gravity determination. Sufficient liquid is introduced to exactly fill the wide tube to the mark (*b*), and to stand at a moderately low mark on the Cc. burette (*d*), which is read off; the liquid is then lowered from the wide tube to some distance below the stopper, the latter is carefully taken out, and allowed to hang by the rubber tube (shown in the drawing suspended from a ring). The weighed substance is then introduced (either in powder or in pieces), the stopper is replaced on the large tube and the liquid allowed to flow back from the graduated tube to the mark (*b*). On now examining the graduated tube the liquid will stand higher than the previous reading at (*d*), the difference giving the volume displaced by the weighed substance in cubic centimeters. The whole apparatus may be sunk in a deep beaker of water, which may be retained at any particular temperature during the experiment. The rubber tube attached to the top of the burette serves to apply air pressure by the mouth to drive the liquid to the mark (*b*) in the wide tube.—Chem. News, Sept. 24, 1897, 152.

FIG. 2.

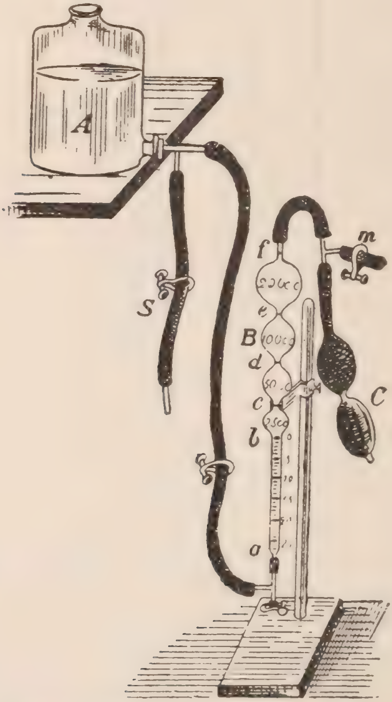


Volumeter.

Graduated Glass Vessels—Correct Method of Calibration.—Démichel gives a number of equations and formulas for calibrating flasks, which he claims will considerably simplify the operation. Referring to this paper, Vandevyver expresses the opinion that the method recommended by Démichel for correcting the error due to surface tension when calibrating glass vessels, is insufficient, as it assumes that the surface tension is constant and invariable, whereas such is not the case. For example, in gradually filling a glass with water, one-quarter at a time, the surface tension varies as follows: ¼ full, 6.35; ½ full, 5.22; ¾ full, 5.09; full, but not overflowing, 4.89; full and overflowing, 7.32. The author considers the following the best method to adopt for getting accurate results: The vessel must first be cleaned with the greatest care, by washing it in acetic acid, caustic potash, then ether, alcohol, and finally rinsing several times with distilled water. It is then dried by inspiration, taking care to keep out dust by lightly plugging with cotton-wool, through which the glass tube passes; when dry, distilled water is run in up to the mark, and the operation proceeded with in the ordinary manner; by this plan the possible error due to the variation of the surface tension is reduced to a minimum. —Chem. News, Oct. 29, 1897, 219; from Rev. de Chim. Analitique, v. (1897), No. 18.

Measuring Pipette and Burette—Advantageous Construction.—Otto Bleier describes an apparatus (shown by Fig. 3) for accurately measuring

FIG. 3.

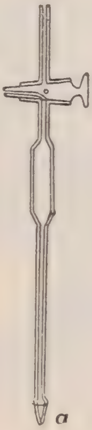


Measuring Pipette and Burette.

distilled water in large portions, such, for instance, as is necessary in making normal solutions. On an elevated shelf is the stock bottle *A*. The tube *S* is used for drawing water which is not to be measured. Another tube, provided—as in the tube *S*—with a pinch-cock, connects with the measuring burette *B*. This burette has a total capacity of 400 Cc.; the lower graduated portion from *a* to *b* holds 25 Cc., and bears a scale divided into Cc.; the bulb *b–c* holds 25, *c–d* holds 50, *d–e* holds 100, and the topmost bulb *e–f* holds 200 Cc. The upper end of the burette is provided with a piece of tubing which connects with a T–tube of glass, bearing a pinch-cock *m*, which is opened when water is allowed to flow into the burette, and the pressure bulbs *C*, which are used to expel the water from it rapidly. The uses to which the apparatus may be conveniently applied readily suggest themselves.—Pharm. Review, June 1898, 232; from Chem. Centralbl. *69*, 593, through Chem. Ztg. 1898, 59.

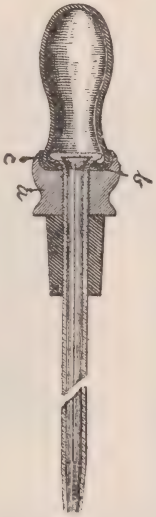
New Pipette—A Useful Modification.—M. Knudsen has devised the pipette shown by Fig. 4. It is provided with a stop-cock, which, when open, permits the liquid to be drawn up by suction to a point above it. The stop-cock being then closed, and the position of the pipette reversed, the excess of liquid may be returned to the container, and the filled pipette carried to any desirable distance, or maintained filled for any time necessary. It is emptied by a turn of the stop-cock, the accurate measurement being to the point *a*. When this is reached, the closing of the cock prevents the further flow.—Pharm. Centralh., Oct. 14, 1897, 685.

FIG. 4.



New Pipette.

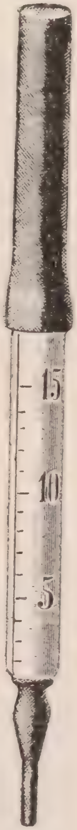
FIG. 5.



Medicine Dropper.

Medicine Dropper—Improved Construction.—Jas. B. Schermerhorn has invented the medicine dropper shown by Fig. 5. A casing, *a*, has a recess, *b*, cut in its upper surface, into which the edge of the nipple or bulb, *c*, is firmly cemented. The upper end of the glass tube flares out and fits into a depression in the casing. To the lower surface of the casing a stopper of suitable material is firmly fixed.—Merck's Rep., June 1, 1898, 343.

FIG. 6.

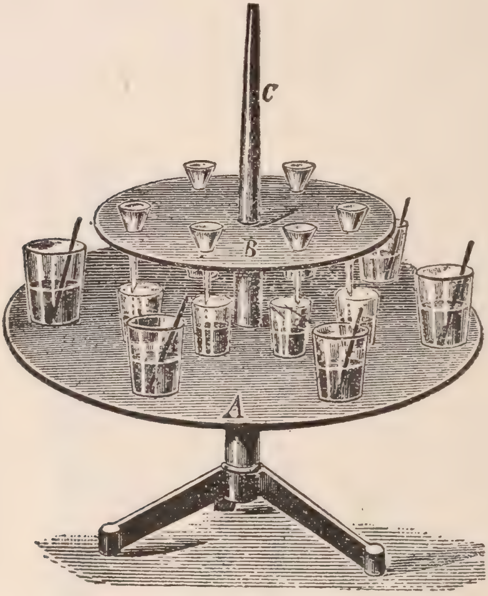


Safety Dropper.

Safety Dropper—Convenient Form.—Fridolin Greiner constructs the safety-dropper shown by Fig. 6, which is intended for use as an eye-dropper, but, being graduated, may be used with equal advantage for measuring small quantities of fluids with accuracy. Its special advantage as an eye-dropper is secured by the soft rubber point, in place of the glass point provided in the common form.—Pharm. Centralh., July 29, 1897, 492.

Filter Stand—Compact Arrangement.—H. Faber recommends the filter stand, shown by Fig. 7, as a practical means of conducting six or more simultaneous filtrations with great economy of space. The two disks, *A* and *B*, may be made of any suitable material, and are fastened at the desired distance apart on a hollow tube which slips over a vertical axis, *C*, on which it may turn freely. The upper disk, *B*, may be perforated for the reception of six or more funnels, according to the size of the disk and funnels employed.—Bull. Pharm. May, 1898, 216; from Chem. Ztg.

FIG. 7.



Filter Stand.

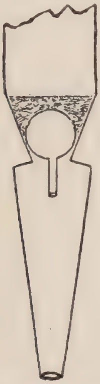
Filter Paper—Reducing Action.—H. Jervis calls attention to the reducing action of filter papers on some substances. While there is no need to state this fact with respect to many oxidizing agents, there appears to be some difference of opinion with respect to dichromate solutions. The author therefore has made experiments with a number of filter papers and solution of $K_2 Cr O_4$ (1 Cc.=0.01 Fe), 25 Cc. of the solution being diluted to 200 Cc., rendered alkaline in the one case with 50 Cc. of normal NaOH, in the other case made acid with 50 Cc. of normal $H_2 SO_4$. He then digested 12.5 Cm. of the paper in the solutions so prepared for half an hour in a water oven. In a few cases, also, the paper was digested in these solutions at the ordinary temperature. The extent of the reducing action of the filter paper under these different conditions is shown in the following table :

12½ Cm. Paper.	Ash.	Cc.K_2CrO_4 after digesting			
		Hot.		Cold.	
		Acid.	Alkali.	Acid.	Alkali.
English (Ford Mill, 428)	0.0048	23.7	24.8		
Schleicher & Schüll (No. 589)	0.0003	23.8	24.2	25.0	25.0
Thin German (S. & S.)	0.0028	24.2	24.6		
Ordinary German (S. & S.)	0.0028	23.6	24.6	25.0	25.0
Swedish (Munktell)	0.0005	24.6	24.9		
French White	0.0070	24.3	24.7		
French Grey	0.0139	22.5	24.0	24.4	24.7
White Blotting (Ford Mill, 428)	0.0095	22.9			

—Chem. News, March 25, 1898, 133.

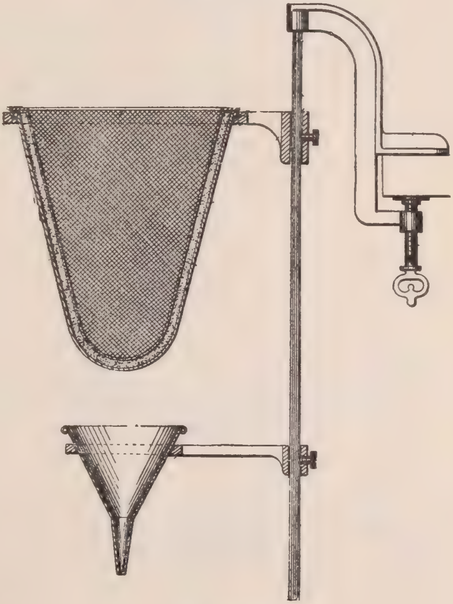
Asbestos Filter—Improved Construction.—A. Goske describes an improved asbestos filter, constructed as shown by Fig. 8. A combustion tube is drawn out at the lower end and constricted at the point where it begins to narrow. A small glass ball placed in the narrow part of the tube fits the tube closely, except for two narrow lateral openings (depressions?—Rep.). A layer of dry asbestos wool is *lightly pressed* down upon the ball to the depth of about 5 Mm., and a second layer is then lightly placed on this. After washing with water several times and drying, the filter is ready for use.—Merck's Rep., April 15, 1898, 242 ; from Journ. Soc. Chem. Ind., 1898, 183.

FIG. 8.



Asbestos Filter.

FIG. 9.



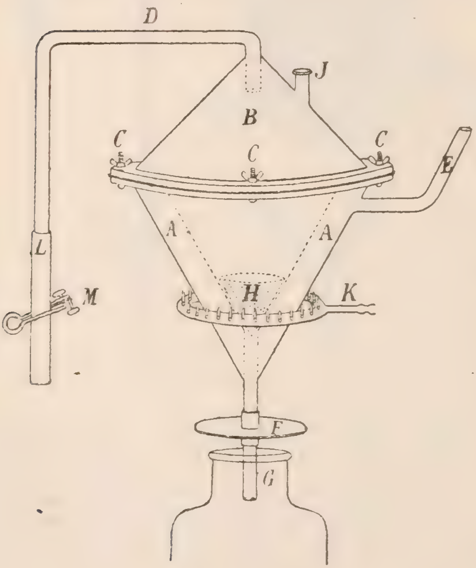
Felt Filter.

Felt Filter—A Novel Arrangement.—A filter possessing the features shown in the accompanying cut (Fig. 9), has been patented by John H.

Eckert. A felt bag is suspended from a ring of suitable size, carried by a perpendicular rod depending from the upper curved end of a clamp. Within the felt bag a wire gauze is placed, the upper margin of the latter ending in an annular band, which rests flat upon the edge of the felt bag. This wire bag is so suspended as to leave a small space between the two bags. The rod also carries a funnel, as shown, the whole probably forming a very useful arrangement.—Merck's Rep., June 1, 1898, 344.

Cotton Filter—Advantage Over Paper.—David R. Dorn strongly advocates the use of cotton filter, particularly at the dispensing counter, both on the ground of greater convenience and rapidity, and because of the greater purity of the cotton; many of the filter papers of the market containing such impurities, as iron, lead, and coloring matters. It is not, however, to be recommended for preparations containing large amounts of suspended or sedimentary solid matters, for the latter will fill the interstices of the filters and prevent the liquid from running through. This applies, generally, to fluid extracts which have become thick through age or premature gelatinization. The making of an absorbent cotton filter, while not particularly difficult, requires some careful study and practice to adapt it to different fluids, its compression being greater or less according to the viscosity, degree of cloudiness, etc. It may be said in general, that the cotton is to be rolled into a cone-shaped pad and pressed down pretty well into the throat of the funnel, the larger part, though, remaining in the body of the funnel. To prevent the cotton from lowering or rising, the liquid should be gradually poured down on a glass rod pressed into the filter.—Bull. Pharm., Feb., 1898, 54.

Fig. 10.

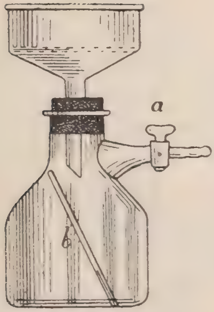


Rapid Filter.

Rapid Filter—A Convenient Apparatus for Oils, Syrups, etc.—Funk has devised the quick-filter shown by Fig. 10, which is easily taken apart, and is particularly adapted for the filtration of viscid liquids, such as syrups, oils, extracts, agar-agar solution, etc. Its action is dependent on the pressure exercised by the enclosed heated air and vapors. It consists of the jacketed funnel, *A*, of copper, provided laterally with a tube, *E*, for the introduction of glycerin, liquid paraffin or other material suitable for maintaining and transmitting heat. The funnel tube, *G*, is provided with a movable shield, *F*, which is intended to cover the mouth of the receiver and prevent the contamination of the filtrate by dust, etc. The cover, *B*, is fastened air-tight to the funnel by interposing a rubber ring and applying the screws, *C*. A tube, *D*, bent at right-angles, extends from the top of the cover and ends in a rubber tube, *L*, which is provided with a clamp, *M*, and by means of which the pressure in the interior of the apparatus can be regulated. The liquid is introduced through the opening, *J*, in the cover, and heat is applied by the ring burner, *K*.—Pharm. Centralh., Dec. 2, 1897, 820.

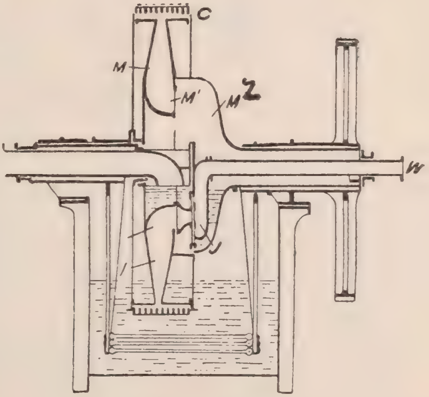
Filter-flask—A Convenience for Suction-Filtration.—A. R. Wahl has constructed the filter-flask shown by Fig. 11, which is convenient for filtration in a partial vacuum. The suction pump being attached laterally at *a*, it was to disconnect as soon as the vacuum gauge shown at *b* indicates a sufficient vacuum. The gauge consists simply of a glass-tube closed at the upper extremity, in which the liquid contained in the flask rises or falls as the pressure is increased or diminished.—Pharm. Centralh. Oct. 14, 1897, 685.

FIG. 11.



Filter-Flask.

FIG. 12.

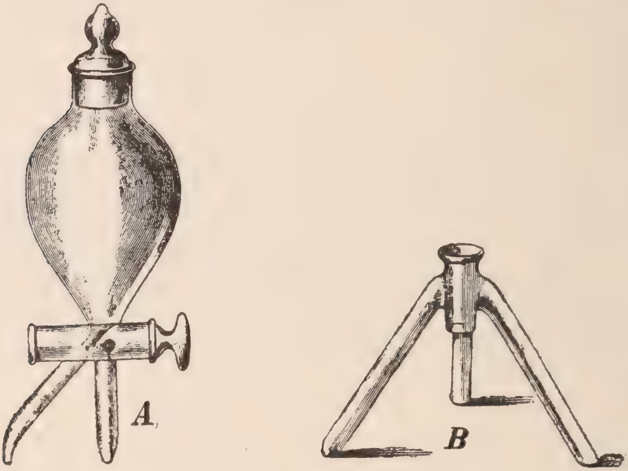


Filtering Drum.

Filtering Drum—Practical Construction.—Solvay & Co. have constructed a rotary horizontal filtering drum which is shown in diagram by Fig. 12. It is divided into several radial compartments, *M*. The openings, M^1, are usually turned towards the vacuum chamber, M^2, and filtration consequently takes place in the usual manner through the filtering layer, *C*. The openings, M^1, only meet the opening of the tube, *J*, at the very lowest points, and on the latter being connected with the air or subjected to pressure the filtrates of each compartment, when reaching the lowest position, are pressed through the filter from the outside, and thus the latter is cleansed. The apparatus is patented in Germany. Pharm. Journ. Nov. 13, 1897, 421; from Chem. Ztg. xxi, 545.

Separating Funnel—New Construction.—E. Spaeth has constructed the separating funnel with stand, shown by Fig. 13 (*A* and *B*), which is intended for convenient use in forensic chemical analysis. The funnel is provided with a two-way stop-cock which enables a complete separation of two immiscible liquids, one of the tubes in the stop-cock being used for the lower liquid, the other for the upper. A special advantage for the stand is that it enables the placing of the funnel in a drying oven or closed water bath when amyl alcohol or chloroform is used. Gentle heat is said to effect a complete separation of these solvents from the aqueous solution. —Pharm. Review, April, 1898, 143; from Ztschr. f. Unters. d. Nahrungsm., etc., 1898, 2, through Pharm. Ztg,, 1898, 162.

FIG. 13.



Separating Funnel.

Gas Generator—Useful Device.—J. W. Richards describes a very useful and simple apparatus which may be used either for the generation of gases or for dissolving solids. The accompanying cuts (Figs. 14 to 20) show several forms in which the new device is applied according to the intended use or convenience, and through which the utility of the device becomes apparent. The vessel containing the solid reagent (or substance to be dissolved) is suspended half-way in a tall jar containing the liquid, in such a way that the heavy solution produced is removed by a long tube reaching quite to the bottom of the jar. The fresh liquid is drawn up through a tube extending several centimeters into the heart of the generator (Figs.

14, 16, 17, 18), or else supplied through holes up into its walls (Fig. 15). The circulation continues long unimpaired, and hence the generation of

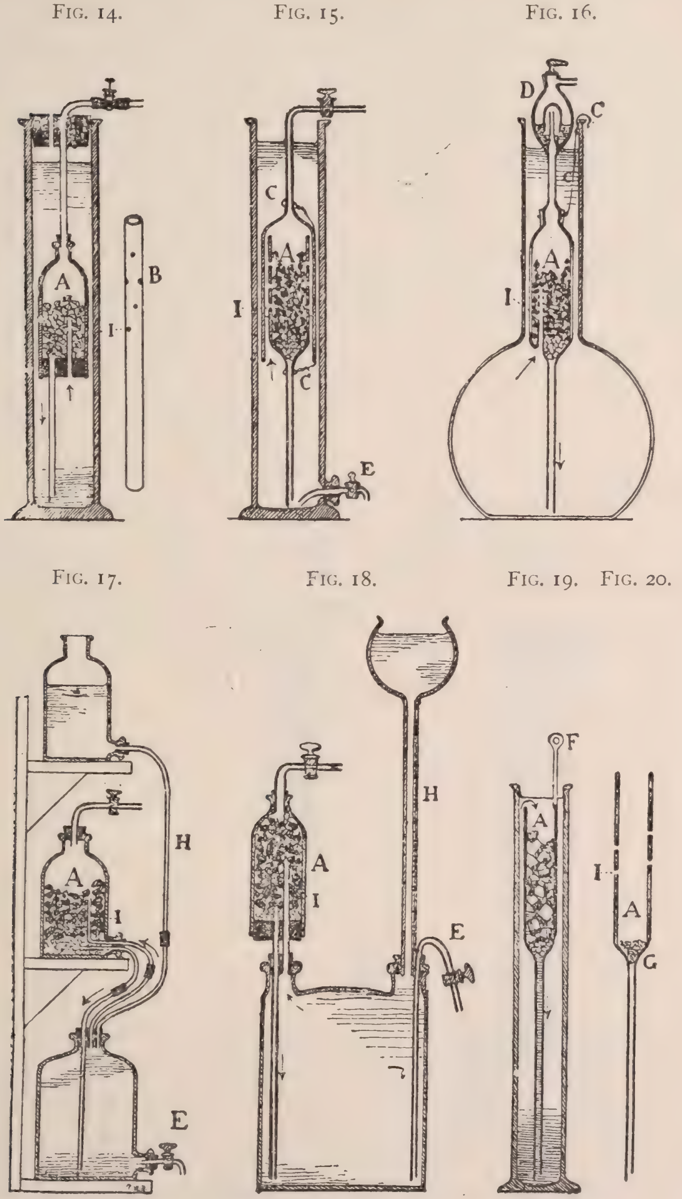


FIG. 14. FIG. 15. FIG. 16.

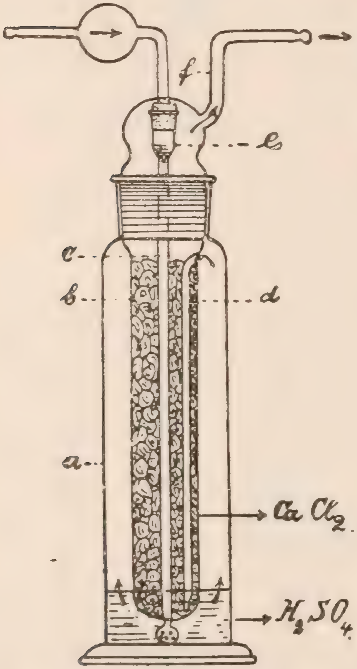
FIG. 17. FIG. 18. FIG. 19. FIG. 20.

Gas Generator.

gas remains remarkably constant. The principle of giving a saturated solution opportunity to remove itself by virtue of its increased weight may also be used to conduct the rapid and automatic solution of crystals; and if the lower part of the receptacle for this solid is plugged with glass-wool, shown in Figs. 19 and 20, this solution may be filtered while it is being made.—Pharm. Review, May, 1898, 189; from Amer. Chem. Jour., *20*, 189.

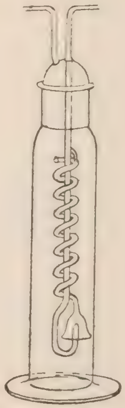
Flask for Washing and Drying Gases—New Construction.—Paul Fuchs describes a new flask for washing and drying gases, shown by Fig. 21, in which the gas is exposed to a much greater surface of the drying agent and the washing liquid than it is in the ordinary washing bottle. It consists of a cylinder, *a*, into which is ground a glass tube *b*, reaching almost to the bottom. The tube *c*, which conducts the gas into the apparatus, is fused into *b* and ends in a small perforated bulb, whereby the gas is divided into small bubbles and so comes into closer contact with the liquid. Beneath the ground portion of the tube *b*, there is fused into it the tube *d*, which reaches nearly to the bottom of *b*. The interior of *b* can be filled with a second drying agent or washing liquid through the tube *d*. The direction of the flow of the gas through the apparatus is indicated by the arrows. The substances in *a* and *b* may be of an entirely different character; for instance, for drying gases, the outer cylinder may contain H_2SO_4, while the inner is filled with $CaCl_2$; or, if the gas is to be purified by passing through two different solutions, the outer cylinder, *a*, may be filled with one of the solutions and the inner tube, *b*, with the other.—Pharm. Rev., April, 1898, 141; from Ztsch. f. Angew. Chem., 1898, 77.

Fig. 21.



Flask for Washing and Drying Gases.

Fig. 22.

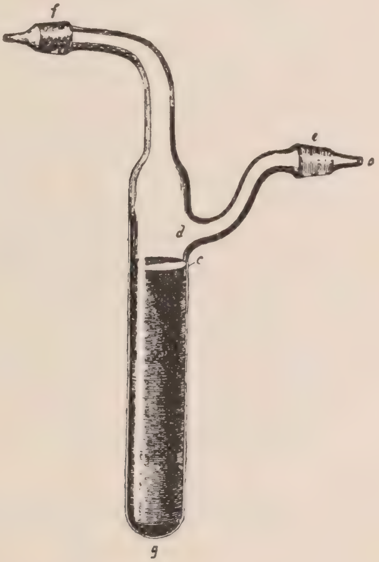


Gas-Wash Bottle.

Gas Wash Bottle—New Construction.—J. Walter has devised the ingenious gas-washing apparatus shown by Fig. 22. The gas delivery tube, which reaches to the bottom of the vessel, is contracted at the end and turned upwards into a small inverted glass bell, forming the end of a spiral coil, which is wound around the delivery tube. The fluid in which the gas is to be washed may be filled to the level of the top of this spiral or not, as may be desired. The gas bubbles collected under the bell rise into the spiral, and each one chases a column of liquid in front of it as it rises in the spiral, so that, as it gradually travels upwards, it comes in contact with a large area of the fluid, while the liquid is thus kept constantly circulating from top to bottom of vessel.—Pharm. Journ., Nov. 13, 1897, 422 ; from Chem. Ztg., xlii., 533.

Wash Bottle—Convenient Construction.—Jos. Loczka describes the wash bottle shown by Fig. 23, the advantages of which are obvious, particularly where small quantities of wash liquids are required. The tube is filled with the liquid by immersing the point *b* and applying suction until it has reached about the point shown at *c*. The liquid may be boiled in the tube when a hot solvent is required. By tilting the tube the liquid flows out at *b* in drops, but a fine stream may be obtained by blowing into the tube at *a*. When not in use the liquid is prevented from evaporating by ground caps shown at *e* and *f*.—Pharm. Review, April, 1898, 142 ; from Ztsch. f. Anal. Chem., 1898, 28.

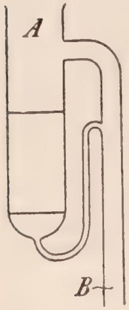
FIG. 23.



Wash Bottle.

Extraction Apparatus — A New Form Applicable to Heavy Solvents.—Jahoda recommends an apparatus shown in Fig. 24, for the extraction of the soluble contents of lighter liquids by heavier solvents, such as chloroform, carbon disulphide, etc. Chloroform, for instance, is poured into the apparatus at *A*, until it flows through the ascending capillary tube into the tube, *B*, and through this into a distilling flask attached to the latter, but not shown in the drawing. The liquid to be extracted is then poured upon the chloroform, until the respective positions are about as shown in the lines in the drawing. A reflux cooler is then attached to *A*, and the chloroform in the distilling flask is heated to boiling, and thus a continuous circulation of the chloroform through the liquid, and its consequent extraction, results.—Pharm. Ztg., Feb. 5, 1898, 90.

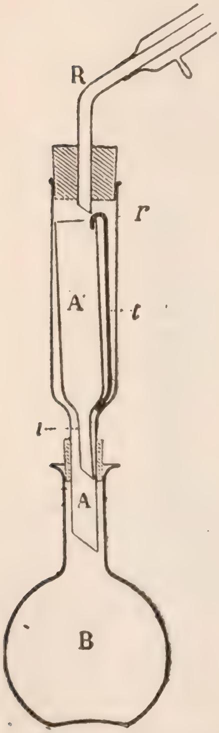
FIG. 24.



Extraction Apparatus.

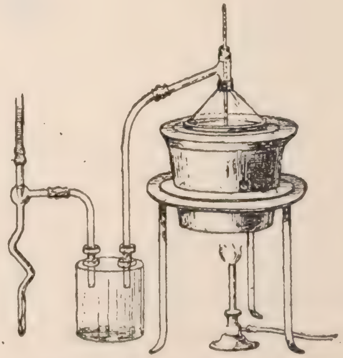
Soxhlet Apparatus—Modification.—Barthe describes the modified form of Soxhlet apparatus shown by Fig. 25. A small tube of the shape shown by *A'*, is inclosed in a large tube of the same shape, *A*. A thin glass rod, *t*, is interposed between the two tubes in the manner shown, the end, *r*, being bent so as to be suspended from the upper orifice of the upper inner tube, while the lower end is interposed between the inner and outer tubes just at their necks. In this manner the vapor of the solvent contained in the flask, *B*, can issue freely through the interstice, *i*, between the two tubes, and thus reaches the condenser, *R*, where it is condensed and falls back into the inner tube, which is the percolator proper. Through this it again reaches the flask, to be again vaporized, and so on until the extraction is finished.—Merck's Rep., Dec. 15, 1897, 763; from Rep. d. Pharm., ix, 498.

FIG. 25.



Soxhlet Apparatus.

FIG. 26.

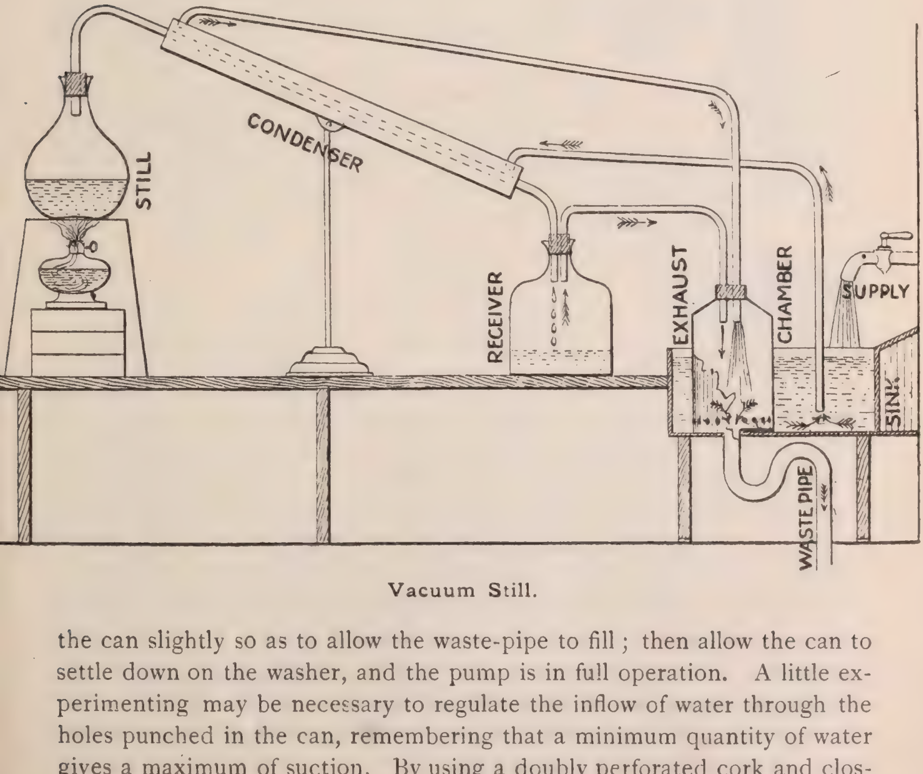


Small Vacuum Apparatus.

Small Vacuum Apparatus—Economical Construction.—Hausmann recommends a small vacuum apparatus for laboratory use, which is constructed by accurately fitting a glass funnel on to a flat cylindrical porcelain vessel with a broad smooth edge, and as may be seen in the drawing (Fig. 26), connecting the stem of the funnel with any available air-pump by means of a tube. The dimensions of the apparatus are such as to be easily inserted into the water bath usually employed in laboratories. It will doubtless be found useful for many purposes of distillation under reduced pressure.—Pharm. Journ., May 28, 1898, 521.

Vacuum Still—A "Home-Made" Filter Pump.—H. De Allges describes how a filter-pump may be economically constructed as follows: Take an old can, such as a one-gallon olive-oil can; cut a round hole, about two inches in diameter, in the bottom; place this over the waste-pipe in the sink, and make air-tight connections by means of a rubber washer; drive a nail three or four times through the sides of the can near the bottom, the holes so made serving to supply the necessary water to maintain the action of the pump when once started; then connect the top air-tight with the filter, prepared in the usual way. To operate, place the can in position, hold it down and turn on the water; when the sink is nearly full, tilt the can slightly so as to allow the waste-pipe to fill; then allow the can to settle down on the washer, and the pump is in full operation. A little experimenting may be necessary to regulate the inflow of water through the holes punched in the can, remembering that a minimum quantity of water gives a maximum of suction. By using a doubly perforated cork and closing the small holes in the can, the water may be made to refrigerate a

FIG. 27.

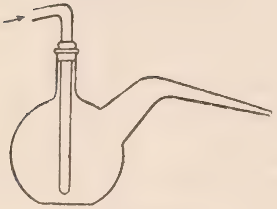


Vacuum Still.

condenser for distilling at slightly-reduced pressure or at the ordinary pressure. The length of the waste-pipe, of course, will determine the strength of the pump. The accompanying sketch (Fig. 27) shows the apparatus in position for distilling operations in a partial vacuum.—West. Drugg., Oct., 1897, 457.

Retorts—Advantageous Construction.—J. Ziegler describes the retort shown by (Fig. 28), which owing to the peculiar construction of the neck, has many advantages over the retorts of the usual shape. Thus, spirting over is entirely avoided. Its general shape shows it to be a combination of the ordinary flask and retort. Pharm. Centralh. Oct. 14, 1897, 685.

FIG. 28.

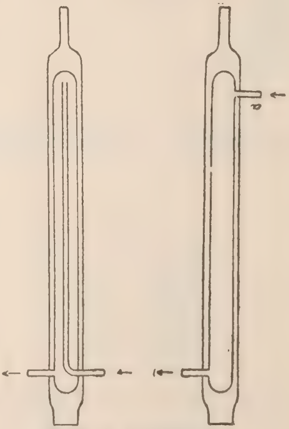


Retort.

Cheap Still—Construction.—Will F. Roach shows how a cheap still may be made from an old copper can in good condition, such as one of those in which oil of lemon is imported. He gives details which would seem to secure an efficient still, but requires the work to be done by a skilled workman. The paper accompanied by several drawings may be consulted in Amer. Drugg. April 25, 1898, 221.

Reflux Condenser—New Construction.—In order to avoid the condensation of vapor on the outer surface of condensers of the ordinary construction, and the consequent liability to contaminate the contents of the distilling vessel during operations which required the continued use of a reflux condenser for several hours, J. J. Sudborough and M. E. Feilmann have designed the apparatus shown by Fig. 29 in two examples. In the first the cold water is made to pass through the inner tube and the ether or alcohol vapors are condensed in the annular space between the inner and outer tubes, the outer surface of the condenser being kept warm and the deposition of vapor upon it thus avoided. This form answers particularly for ether. For higher boiling liquids the second form is suggested, as in the apparatus of the first form there would be a great strain on the inlet tube (*a*) through extremes of temperature, and consequent liability to crack. In the second form, therefore, the inlet is from above, as shown.—Merck's Rep., Feb. 15, 1898, 114; from Jour. Soc. Chem., Ind.

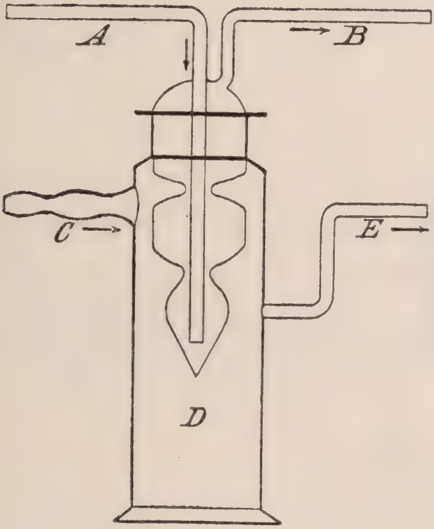
FIG. 29.



Reflux Condenser.

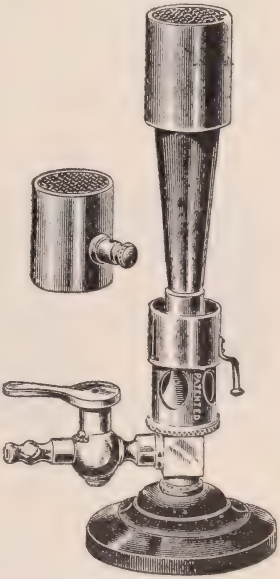
A New Condenser—Construction for Highly Volatile Liquids.—Dr. J. Klimont has devised the condenser shown by Fig. 30, which he recommends as being particularly useful for the condensation of the vapors of highly volatile liquids, a number of them, greater or less according to the nature of the liquid, being arranged so as to form a battery. The inflow of the cold water is at *A*, the outflow at *B;* the vapor enters the condenser *D* through the tube *E*, while uncondensed vapor passes through the tube *C* into the next condenser in the battery series. The apparatus so constructed is considered a great improvement on the form ordinarily in use in analytical laboratories, and would seem to admit of utilization, when constructed in suitable dimensions, for larger pharmaceutical as well as chemical operations.—Pharm. Ztg., July 7, 1897, 468.

FIG. 30.



A New Condenser.

FIG. 31



Bunsen Burner.

Low Temperature Thermometer—Petroleum Ether a Suitable Liquid.—Kohlrausch finds in petroleum ether a suitable liquid for the measurement of very low temperatures. While alcohol coagulates at —100° C., and toluol at a very little lower temperature, ordinary petroleum ether does not congeal at the boiling point of liquid air, which is —190° C.—Pharm. Ztg., 1897 (xlii.), 772.

A New Bunsen Burner—Important Improvement.—In the ordinary Bunsen burner the green central cone of the flame shows imperfect combustion and all the heating effect comes from the outer bluish cone. This serious defect is done away with in Alton's improved Bunsen burner shown by Fig. 31. It combines an automatic suction and continuous draught movement, thus forcibly mixing air and gas in the cone-shaped tube, and this mixture is then burned on the wire-gauge cup. In the cone-shaped tube of the improved burner the gases are prevented from rushing straight up and unmixed as they do in the ordinary straight tube burner, and by causing the gases, which are perfectly mixed from the base of the cone to the top, to pass through the wire-gauze cap, perfect combustion ensues—there is a perfect deep blue cone, and the inner green cone, consisting of unburnt gas, has vanished. The burner can be used with or without the wire-gauze cap, which is supplied separately with the burner. A further advantage of this cap is that the flame can be turned down very low without danger of it "striking back."—Pharm. Rev., June, 1898, 231.

Electric Stove—A New Form for Laboratory Use.—M. D. Sohon describes the electric stove shown by Figs. 32 and 33, which is designed for laboratory use. The copper stove, Fig. 1, is 3 in. in height, exclusive of the legs, and 7½ in. in diameter. The top is filled with concentric rings, while the bottom is left open. About 2 in. below the top is a heating plate, shown at *A*, Fig. 32, which is attached to the legs independently of the body, and readily detached, and having a clearance of ¼ in. all round between it and the wall of the stove. The heat is derived from the coil *B*, of rheostat wire, imbedded in silicate insulation, and resting on a ½-in. asbestos board, *C*. This is covered with a copper protecting-plate, *D*. The coil is in two parts, so that three different temperatures—90°, 100°, and 125°—may be obtained, according to the manner of applying the current by means of the switch *E*. By the use of suitable coils, or by interposing a resistance, the stove may be used with liquids more volatile than water, but it is specially recommended for operation with inflammable liquids. A group of such stoves independently connected is highly preferable to the large water- or steam-baths generally employed.—Merck's Rep., March 15, 1898, 181; from Jour. Soc. Chem. Ind.

FIG. 32.

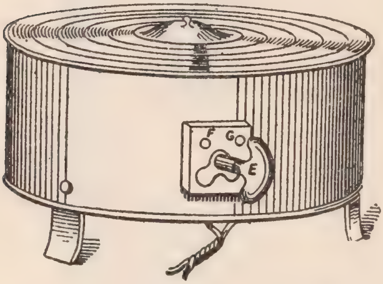
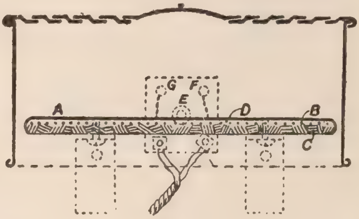


Fig. 33.



Electric Stove.

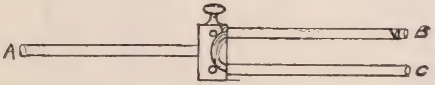
Superheater—Improved Construction for Laboratory Purposes.—J.

Arthur Wilson observes that the usual apparatus used for laboratory distillation with superheated steam is a copper coil heated by a Bunsen burner. He has found this plan rather unreliable, as the temperature of the steam is subject to considerable fluctuation. A better plan, which gives perfectly satisfactory results, is to place the coil in a copper cylindrical vessel containing paraffin or a similar body. The vessel is heated by a powerful burner, and the temperature equalized by a copper stirrer.—Chem. News, Jan. 21, 1898, 25.

Acetylene Lamp—Satisfactory Construction.—Violle, for the Committee on Economic Arts, reports that in Gossart's lamp the acetylene is generated as is usual by the action of water on carbide of calcium, but its inventor has made use of the action of capillary tubes, whereby the water is brought in contact with the carbide in very minute quantities, and automatically only in the quantity required. By turning off the water tap and the gas outlet tap at the same time the apparatus ceases to work, and no more gas is formed until both taps are turned on again. By turning off the water tap only, the disengagement of gas becomes slower, and gradually stops. If, on the other hand, the gas tap only is turned off, the gas continues to be evolved until the pressure is sufficient to drive back the water in the capillary tubes, which thus act as a safety-valve. The production of gas is thus intimately dependent on its consumption. Chem. News Oct. 8, 1897, 182; from Bull. Soc. d'Encouragement pour l'Industrie Nationale, Aug. 1897.

Three-way Stop-cock—Novel Construction.—C. Mueller, London, makes the ingenious device, shown by Fig. 34, which will have many applications in gas analysis and in other ways. By means of it a gas may be passed from *A* to *B*, from *A* to *C*, or from *B* to *C*, or all three tubes may be shut off.—Pharm. Journ., May 28, 1898, 521.

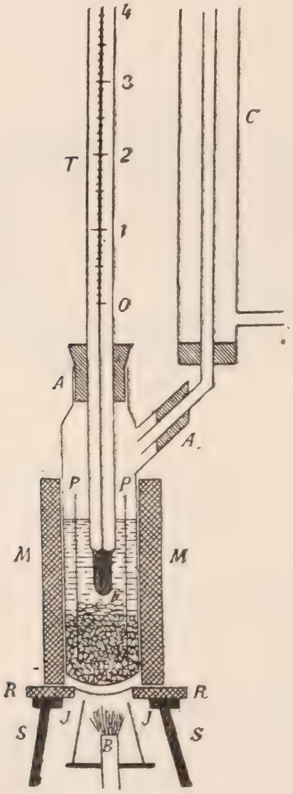
Fig. 34.



Three-Way Stop-Cock.

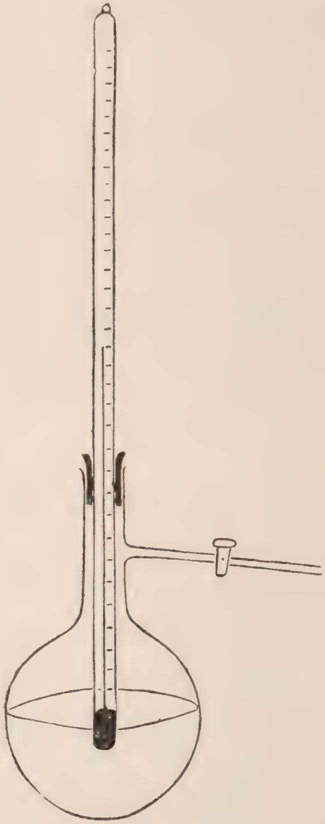
Boiling-Point Apparatus—Improved Construction.—H. C. Jones has devised the apparatus shown by Fig. 35, which facilitates the determination of the boiling points of liquids and is free from several objections inherent to the apparatus commonly employed. The most important improvement is that radiation from the thermometer bulb and consequent error in the observed temperature is prevented, and the reduction in the temperature of solutions under examination, due to the return of the cooler condensed fluid, is obviated. The improvement consists in introducing into the boiling flask *A*, the platinum tube *P*, which is open above and below, and is embedded in glass beads, which are covered with irregularly-cut pieces of platinum foil and wire. The thermometer, *T*, is introduced into the boiling flask by means of a cork, but the flask is also provided with a ground glass stopper, so that when it is disconnected it may be weighed with contents without loss consequent upon evaporation. The flask is also provided laterally with a condenser, *C*, by means of the cork, *A*, and is provided with the jacket, *M*, of asbestos felt, about 1½ Cm. thick, resting upon an asbestos ring, *R*, and supported by the tripod *S*. The source of heat is a Bunsen burner, *B*, the flame of which is protected by the cone *J*. The apparatus is applicable both to high and low boiling liquids.—Pharm. Ztg., Sept. 8, 1897, 614; from Chem. Centralb., 1897, ii., 7.

FIG. 35.



Boiling-Point Apparatus.

FIG. 36.

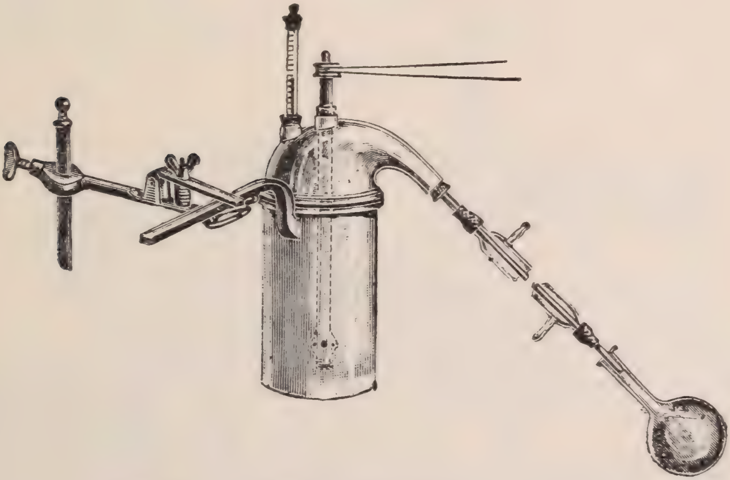


Water-Boiling Apparatus.

Apparatus to Exhibit Water Boiling in a Partial Vacuum.—Prof. W. R. Hodgkinson describes the apparatus shown by Fig. 36, by means of which the ancient experiment that water boils in a closed inverted flask when cold water is poured over it can be more conveniently exhibited in the lecture room. It consists of a distilling or fractioning flask with a stop-cock sealed on the side tube, and a wide thermometer, wedged by rubber ring in the neck, just dipping into the water. In this case the flask need not be inverted, and the temperature can be read off at which the liquid—water or some other—goes through the process of boiling. For liquids of higher boiling point than water, a 500 Cc. capacity is enough, and water must not be used for cooling; air from a small bellows is sufficient. For water a 1000 or even 1500 Cc. flask is not too large, if the experiment is to be seen at a distance.—Chem. News, Sept. 24, 1897, 152.

Melting, Distilling and Subliming Apparatus—Practical Construction.—Dr. L. Paul has devised the apparatus shown by Fig. 37, which can be obtained through Kaehler and Martini, Berlin. The material of which the apparatus is made is highly resistant, "sanitäts" porcelain. The advantages claimed are as follows: The handle at the side permits easy manipulation and allows the apparatus to be clamped to an ordinary stand. The double tubulated head permits the introduction of a thermometer, and a stirring apparatus, as shown; or the openings can be used for distilling with a current of air, in case of sublimation or distillation of substances of high melting point. The head, which is fastened on to the body by means of clamps, is easily removed, and the apparatus readily cleaned.—Pharm. Review, Sept. 1897, 184.

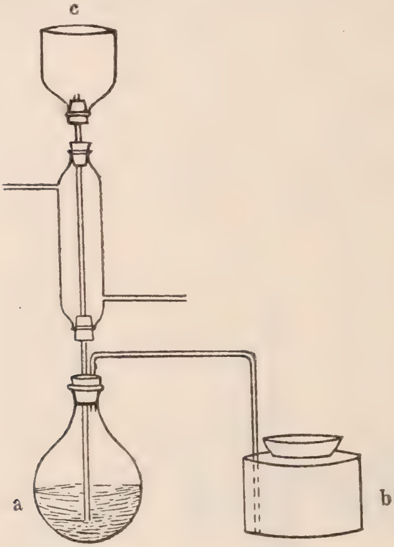
FIG. 37.



Melting, Distilling and Subliming Apparatus.

Automatic Water Bath—Construction.—Prof. Jos. Habermann describes the automatic water-bath, to which attention is directed because the principle upon which its construction rests may be usefully applied in the pharmaceutical laboratory. The water in the flask *a* (Fig. 38), being heated to boiling, the generated steam passes into the water-bath, *b*, where it serves the purpose of evaporating or heating the contents in the capsule placed upon it. The tube, extending to near the bottom of the flask *a*, communicates with a reservoir (an inverted bottle) *c*, for the supply of *cold water*, and is kept cold by means of water circulating through the interposed cooler shown in the drawing. As soon as the water in *a* has evaporated down so far as to expose the lower extremity of this tube, some cold water will enter the flask from the reservoir *C*. This influx creates a partial vacuum, in consequence of which the hot water condensed in *b* will return to *a*, and ebullition soon begins again.—Pharm. Centralh., Sept. 23, 1897, 627.

FIG. 38.



Automatic Water Bath.

Combination of Evaporating Dish and Funnel.—S. Bosujakovic uses the novel apparatus shown by Figs. 39 and 40, for precipitating and collecting the precipitate in the same apparatus by filtering through asbestos or glass wool. It can also be used for collecting and weighing the residue left by evaporation. It saves the trouble and loss occasioned by transferring from a vessel to a funnel. Fig. 39 shows the funnel in position for use as an evaporating dish; in Fig. 40 it is in position for use as a funnel.—Pharm. Review, April, 1898, 142; from Ztsch. f. anal. Chem., 1898, 30.

Fig. 39.

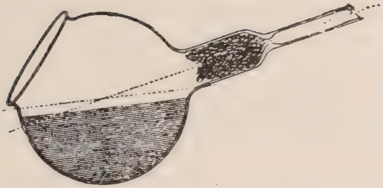
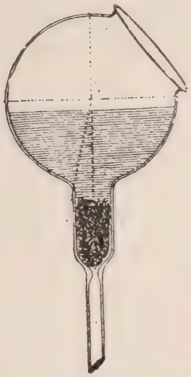


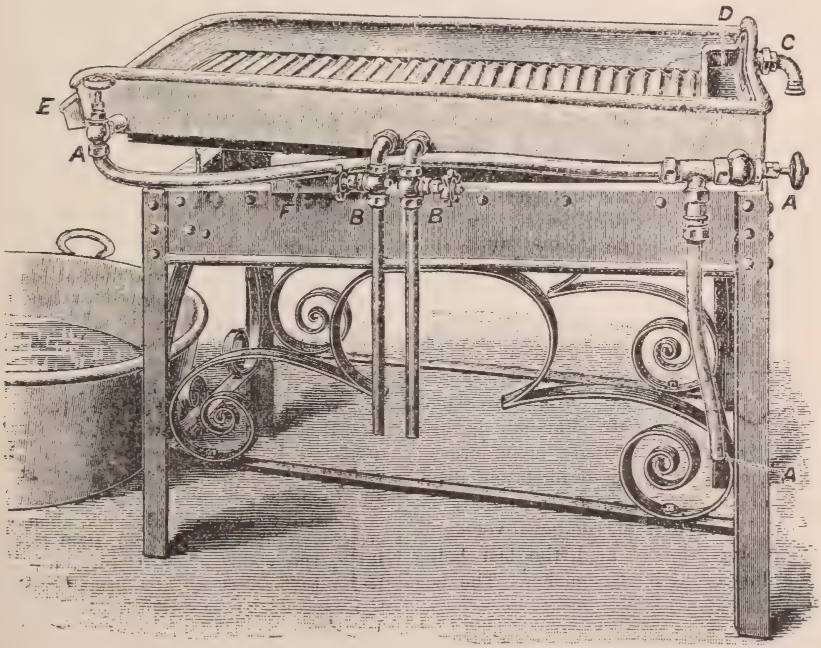
Fig. 40.



Combination of Evaporating Dish and Funnel.

Evaporating Tray—A Useful Laboratory Adjunct.—The apparatus shown in the accompanying cut (Fig. 41) has been used with advantage in some of the London laboratories during the last few years, and is apparently a very useful adjunct to the ordinary laboratory fittings. It consists of a corrugated-copper tray moving on a central screw, which sets the

Fig. 41.

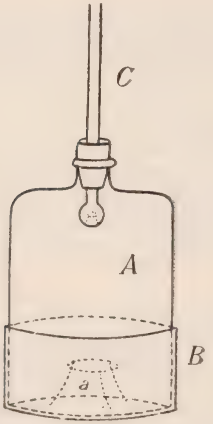


Evaporating Tray.

pan at the incline desired. Dry steam enters the pan at the two pipes *A A*, and, passing through the corrugations, escapes at *B B*. The fluid to be evaporated is introduced at *C*, where it falls into a perforated trough *D*, which distributes it equally upon the whole width of the tray. The rate of evaporation is determined by the angle at which the tray is set. If the angle is acute the liquid flows down quickly to *E*, and is therefore slightly concentrated ; as the angle is decreased evaporation is increased, until at the level a perfectly dry extract can be obtained. The tray works well in practice, and those who use it are delighted with it. It is made under a patent by R. Sumner & Co., Liverpool.—Chem. & Drug., Aug. 28, 1897, 367.

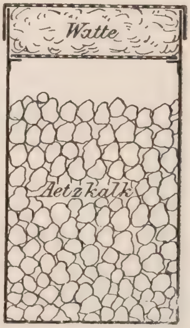
Drying Apparatus—Simple Construction.—Prof. Jos. Habermann describes the drying apparatus shown by Fig. 42, which is both simply and economically constructed, and has the advantage that its contents may be observed during the process of drying. It consists of the bottle *A*, cut off just above the bottom, which is placed upon a thin layer of sand or a disc of asbestos felt in a vessel of tin or porcelain *B*. The substance to be dried is placed upon a tripod *a*, and heat is applied to the vessel. The moisture-laden air escapes through the glass tube *C*, which is provided with a bulb beneath, serving for the collection of condensed moisture that may fail to escape.—Pharm. Centralh., Sept. 23, 1897, 626.

FIG. 42.



Drying Apparatus.

FIG. 43.



Drying Can.

Drying Can—A Convenient Arrangement for Drug Drawers.—C. M. Schäfer has devised a simple arrangement for keeping drugs dry in the drawers and other drug containers. It consists of a tin can, as shown by Fig. 43, filled to about two-thirds its capacity with fresh burnt lime, and provided with a perforated shelf (wire-sieve cloth) near the top for the reception of a generous layer of cotton. The can is closed with a lid provided with numerous perforations, or better, with the upper surface made of wire-sieve cloth. Placed into the drug containers, the lime absorbs the moisture and not only preserves the drugs in a dry condition, but has the effect of drying them if insufficiently dried. Its compactness and general adaptability will be appreciated by careful dispensers.—Pharm. Ztg., Sept. 15, 1897, 632.

American-Made Chemical Glassware — Satisfactory Quality. — At a regular meeting of the "Society of Chemical Industry," February 25, 1898, E. C. Uhling exhibited and called attention to a line of American-made chemical glassware, which elicited the interesting fact that great advances have been made in the manufacture of such ware, and that many of the articles now produced are fully equal to the imported. In the case of the American glass, the high percentage of silica was cited as a good feature.—Amer. Drug., March 10, 1898, 128.

Glass Vessels—Mending with Gutta Percha.—"W. L. S." recommends gutta-percha in strips for mending glass funnels and percolators. The pieces having been cleaned, they are placed in boiling water for a few minutes, quickly dried, and then brought together in the proper position, holding them by strips of gutta-percha placed over the crack on both sides of the glass. If the gutta-percha does not adhere, heat it by means of a spatula or iron until it becomes sticky. Gutta-percha melts at 212° to 225°, and is decomposed at 265° F., so too hot an iron must not be used. Alcohol does not affect it, and the joint will be tight to all the fluids except chloroform, carbon disulphide, concentrated acids, and volatile oils.

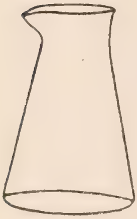
Mortars and Pestles may also be mended by the aid of gutta-percha, by melting it with an equal part of shellac. When a homogeneous mixture results it is applied hot to the warmed edges of the mortar. In the case of a pestle which has become detached from the handle, the mixture is poured in the warmed pestle socket and the handle introduced. The cement has enough elasticity to stand the blows and not crack away.—Bull. Pharm. Febr. 1898, 76; from "Spatula."

Glass Apparatus—Method of Perforation, etc.—H. Jervis calls attention to some simple manipulations that will enable the operator to construct his own apparatus in many instances instead of purchasing them at considerable expense. A common example of this is seen in the number of makeshifts for tubulated bottles and other articles requiring a hole here or there. This of itself would show that the ability to perforate glass is not largely possessed by the every-day operator. The process is so serviceable that a few lines explaining the modus operandi will be acceptable to many who have never previously tried to do the job, and perhaps helpful to those who have previously left the matter to the "engineering shop," and finally concluded that it needed special apparatus. If, for instance, we wish to make a hole through a cover glass, make a few scratches in the form of an asterisk with the point of a broken three-square file dipped in turpentine; rest the cover on a wooden block or piece of cork; then turn the sharp point of a similar file backwards and forwards on the mark, or use the point of a broken file fitted in a brace, and the hole is through in a few minutes. In some cases, usually with sheet glass, it is better to bore from each side. Such articles as bottles can be conveniently fixed in position, resting on a partly opened heavy drawer; but throughout these operations the tools must be kept moistened with turpentine, or turpentine and camphor. For widening the hole made, a tapering file—preferably an ordinary flat file, is used. Porcelain can be similarly perforated.

The breaking of thick combustion tubes is really an easy operation if conducted as follows: Make a decided scratch at one portion of the tube, and then complete the circle in a fainter line—not necessarily fainter. An iron rod (1/8 or 1/4 inch) meanwhile pushed up the burner of a muffle will now become hot; lay it on the deeper scratch until it approaches blackness, and then, if the fracture has not already occurred, touch the heated glass with the tip of a wetted finger. The fracture is in most cases as even as possible. Occasional irregularities are leveled up with the pliers. The effect is greater and the danger of fracture less if the pliers are used from the outer diameter of the tube.—Chem. News, Oct. 29, 1897, 211.

Beakers—An Old Form Renewed.—The firm of Kaehler & Martini, Berlin, have re-introduced a form of beakers, under the name of Phillips' beakers, which was originally described by Faraday. This beaker, shown by Fig. 44, combines the shape of the Erlenmeyer flask and the ordinary lipped beaker, and is found particularly serviceable in analytical precipitations.—Pharm. Centralhalle, Oct. 14, 1897, 685.

FIG. 44.



Beaker.

Indicators—Resumé of the Kinds Used in Titrimetric Methods.—Alfred I. Cohn, after discussing the function of indicators in the titrimetric methods of assay, enumerates the principal indicators employed and known to be of distinct value, briefly reviews their characteristics and the purposes for which they are used. The list is arranged in two divisions, each in alphabetical order, the one embracing the direct, the other the indirect indicators. The paper may be consulted in Merck's Rep., June 1, 1898, 329, et seq.

Tintometer—Description.—An apparatus used in matching or comparing colors is described by Lunt. It consists of a wooden body, about 15 inches long and about 3 inches square, open at both ends, the interior being divided longitudinally into two compartments and colored black.

This body is provided with a graduated support, and colored glasses of standard tints and silvered tumblers or glasses, the comparison or matching of colors being effected by placing the glass of the standard color, or a glass containing a colored fluid, and the subject for comparison, side by side at one end, while the operator looks through the body above described toward the light.—Pharm. Era, July 29, 1897, 140.

Botanical Hand Press—Simple Construction.—Henry Elms describes a hand press for botanical specimens which he has used for some time with great satisfaction, and which can be constructed with little trouble or cost. In the accompanying cuts, Fig. 45 shows an edge view lengthways, Fig. 46 a top view of the press. *a a* represent two pieces of wood with smooth surfaces, each 14 inches long, 8 inches wide, and ½ an inch thick; *b b* and *c c* are strips of wood, each 6 inches long, 2½ inches wide, and ½ an inch thick. Into the upper strips, *b b*, the top plates of the the thumb screws, *d d*, are let in flush with the surface, while into the corresponding lower strips the wormed plates belonging to the thumbscrews are let in in the same manner. The thumb-screws are of brass, 2 inches by $\frac{5}{16}$ inch, each screw passing through the entire thickness of *a*, *b* and *c*. The dotted lines on Fig. 46 show how the cross-pieces (*b b*) above, and the cross-pieces (*c c*) below, may be moved at will by loosening the screws slightly, and when in the required position held there by tighten-

FIG. 45.

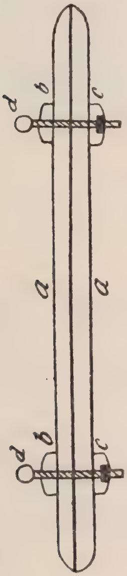
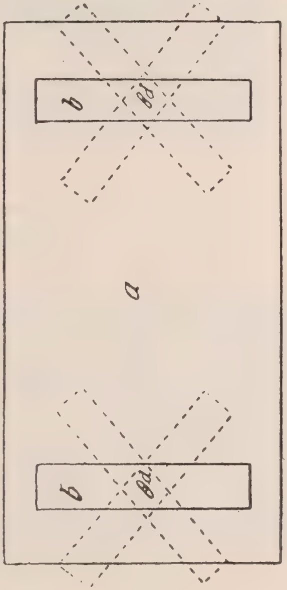


FIG. 46.

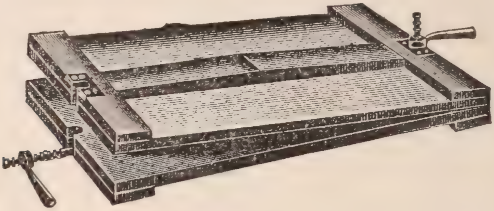


Botanical Hand Press.

ing the screws, in this manner exercising a more uniform pressure on the whole surface of the boards (*a a*).—Pharm. Jour., July 10, 1897, 21–22.

A New Plant Press—Convenient Construction.—Fred. Reynolds describes the plant press shown by the accompanying cut (Fig. 47). As ordinarily constructed it consists of two boards with poles in the top board for the two screens to pass through. The screws are generally far too long, and the thread is very fine and therefore slow. The author's improvement consists in using short screws with a quick thread, which are hinged to the bottom board, so as to fall down and allow the top board, which is slotted at the ends for the reception of the screws, to be removed with the utmost despatch and facility. About two turns of the handle puts on pressure or permits the removal of the board.—Pharm. Jour., Nov. 6, 1897, 398.

FIG. 47.

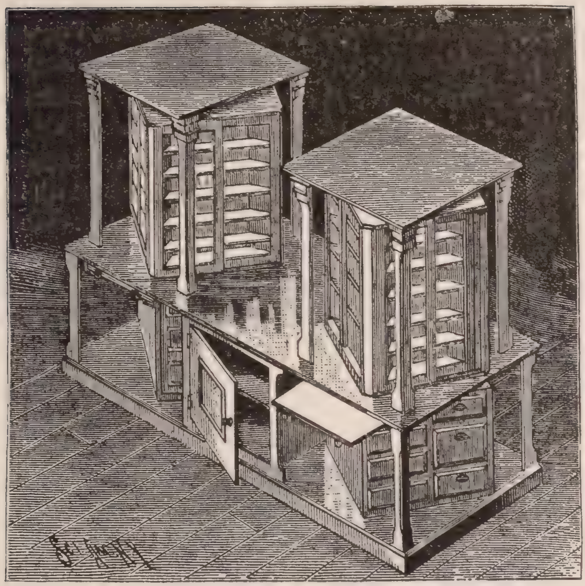


A New Plant Press.

Pharmaceutical Preparations—Causes of Deterioration to be Avoided.—Leon C. Fink calls attention to a want of proper recognition by pharmacists of the physical and chemical changes brought about in many medicaments through the influence of air, moisture, cold, heat, and sunlight. Once these influences are understood and considered, the changes and resulting deterioration may often be avoided by the taking of proper care. The author points out numerous examples, and his paper may be consulted with advantage by those who wish to avoid losses consequent upon the improper care and preservation of their stock of pharmaceuticals.—Bull. Pharm., March 1898, 105.

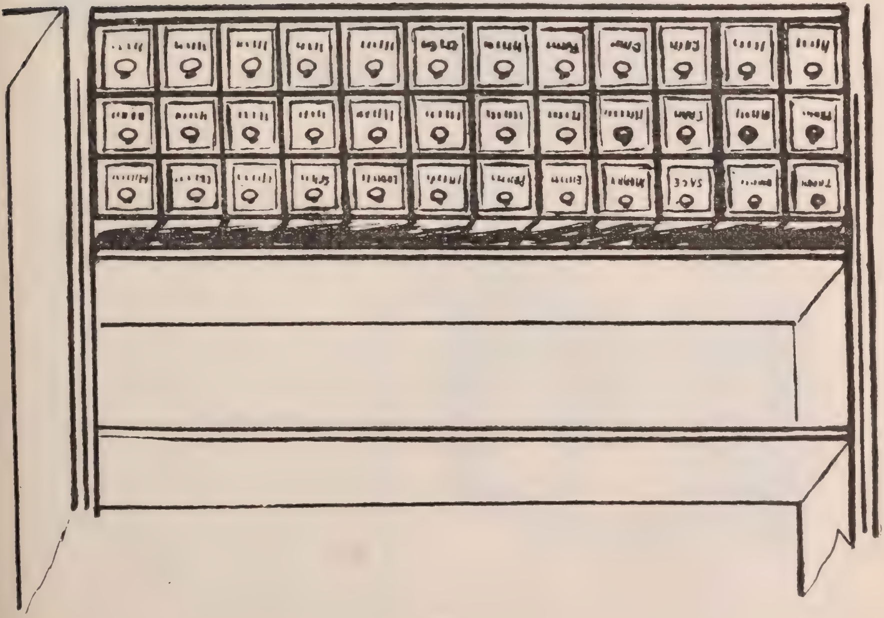
Prescription Cabinet—Advantageous Construction.—Dr. J. M. Worthington has invented the prescription cabinet shown by Fig. 48, whereby time, space, labor and material are economized. It is designed that the medicines shall be so arranged that those given in large doses will be held by large bottles in the bottom portion of the cabinet, while the powerful and dangerous medicines will occupy the smaller upper compartments. Owing to the simple arrangement of revolving drawers and shelves, different attendants may work at the same cabinet without inconveniencing each other.—Bull. Pharm., April, 1898, 168.

FIG. 48.



Prescription Cabinet.

FIG. 49.

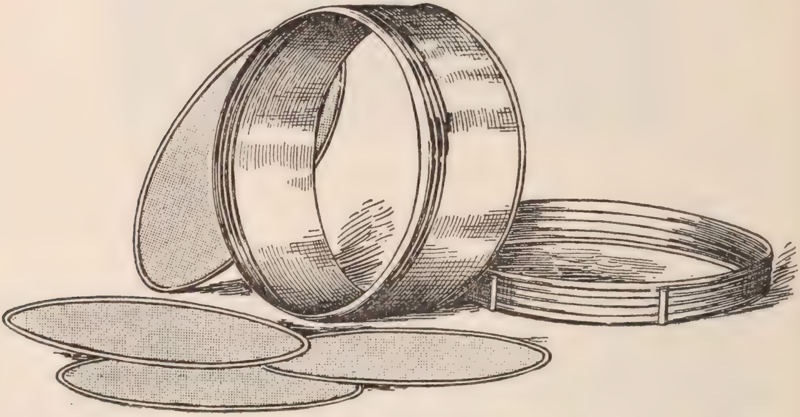


Container for Pressed Herbs.

Container for Pressed Herbs—Construction from Cigar Boxes.—C. I. Wolfe gives a hint to the economically inclined pharmacist by describing the home-made container for pressed herbs shown by Fig. 49, which not alone answers the purpose as well as the more or less expensive containers that are usually employed, but also presents a neat appearance. It is nothing more than a set of cigar boxes of uniform size and kind. In the end of each is fitted a screw-eye with a ring to act as a drawer pull, and a neat label—written or printed, as fancy may dictate—is pasted on each. When arranged on a shelf so as to fill the entire space, the appearance is pleasing. To those not willing to use cigar boxes, strong paper boxes of suitable size are available at small cost; but the author thinks that the cedar-wood preserves the herbs better and has the further advantage in being stronger.—Amer. Drugg., Feb. 25, 1898, 95.

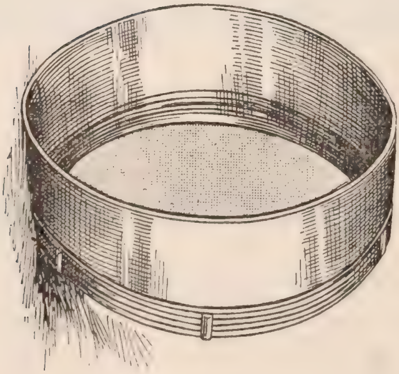
Pharmaceutical Sieve—New Form.—The new form of pharmaceutical sieve shown by Figs. 50 and 51 presents conveniences that would appear to insure its extended use. It is the invention of J. Frank Strawinski, and consists of a body or frame of brass, tinned on the inner surface, and provided at the base with a coarse threading over which a collar containing the sieve-plate is conveniently screwed, and again unscrewed for the insertion of a sieve plate of a different mesh. The collar is provided on the exterior with five finger-holds, so that

Fig. 50.



Pharmaceutical Sieve.

Fig. 51.

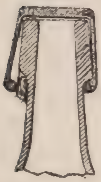


Pharmaceutical Sieve.

it may be adjusted quite firmly. The several parts of the sieve are shown in the illustrations.—Alumni Rep., May 1898, 93.

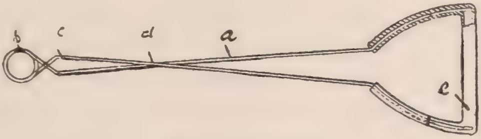
Bottle-Stopper—A Useful Form.—Alexander Backhaus has patented an improved bottle-stopper, which is shown by Fig. 52. It consists of a flexible stopping cap, provided with an inwardly thickened edge, which engages a depression formed from the lip of the bottle when the cap is drawn over, as shown in the cut.—Merck's Rep., June 15, 1898, 371.

FIG. 52.



Bottle Stopper.

FIG. 53.

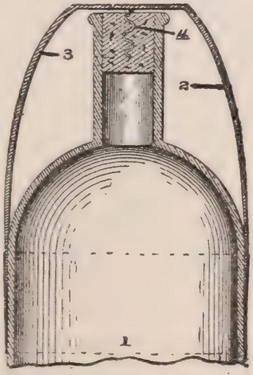


Bottle Cleaner.

Bottle Cleaner—An Efficient Implement.—Lawrence J. Widness has invented the bottle cleaner shown by Fig. 53, by means of which every part of the interior of a bottle can be brought in contact and thorough cleaning effected. The device is made of steel or other suitable material, *a*, twisted into a spring, *b*, and angled at *c*. The shanks cross at *d*, and the lower ends are shaped as shown, the extremities being looped to prevent the fabric, *e*, which is slipped over the ends, from being torn. Merck's Rep. May 15, 1898, 307.

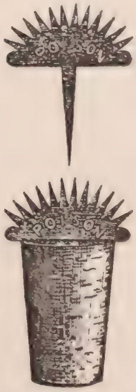
Cork Protector—A Simple Device.—Charles W. Makey has devised and patented the device shown by Fig. 54, which when applied to bottles insures against the withdrawal of the cork and possible tampering with its contents. It consists of a cork-screw (4), bearing oppositely-projecting extensions (2 and 3) adopted to lie snugly against opposite sides of the bottle. These extensions are held secure by the label (1) applied to the bottle.—Merck's Rep. May 1, 1898, 281.

FIG. 54.



Cork Protector.

FIG. 55.



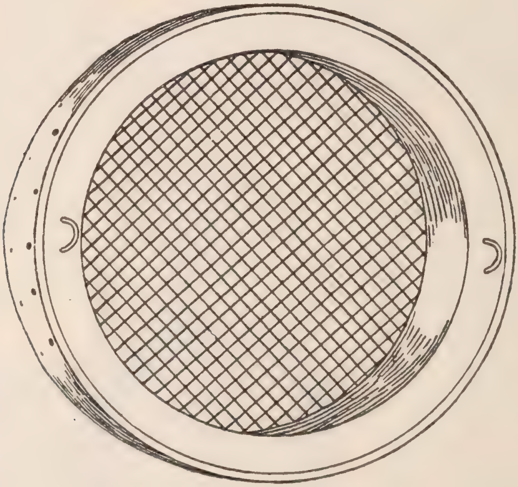
Poison Guard.

Poison Guard—Useful Construction.—A Toronto pharmacist has invented the poison guard shown by Fig. 55, which recommends itself on account of its great simplicity. It is a half-disk of block tin with raw-tooth edge, stamped with the word "Poison," and provided with a sharp spike by means of which it is attached to the cork. Its use seems calculated to prevent accidents through ignorance or carelessness of the patient or nurse. Can. Pharm. Journ. July 1897, 516.

Bottle Labels—Practical Observations.—H. Jervis makes some practical observations on bottle labels for laboratory use. He states that the ordinary unprotected adhesive label does not long resist the attack of damp acid fumes, which are always in the air of an active laboratory. Of the varnishes, balsams, etc., used to coat the surface, paraffin wax is about the most handy and serviceable. Faraday recommended a mixture of Brunswick black with half its bulk of oil of turpentine; the mixture to be kept in a bottle whose stopper was perforated with a thick-nibbed pen. A more tasty label of a similar sort may be made by grinding sealing-wax, first dry and then mixed with a little alcohol and ether in such proportion as to make a thick liquid. Such liquid is best applied to the bottle with a small stiff brush. If the bottle can be warmed it is feasible to write on the heated surface with the pointed end of a piece of sealing-wax. Such labels never "gang agley," as the most carefully varnished paper labels sometimes do.—Chem. News, March 25, 1898, 133.

Label Pasting—Appliances to Render the Operation Neat and Simple.—Joseph F. Hostelley makes some practical observations on label pasting, an operation which, as carried out by the average druggist, is an exceedingly primitive, in many instances slovenly, operation. To effect neatness, cleanliness and dispatch, he has constructed and described several

FIG. 56.



Label Pasting Appliance.

simple contrivances. By Fig. 56 a contrivance is shown for regulating the amount of paste to be exposed to the brush. It consists of a hard wood ring, cut from a ⅝″ board, the diameter of which is ⅛″ less than the inner diameter of the paste pot, the edge of the ring being ⅜″ wide. A circular piece of wire (screen) netting, corresponding in size to the outer circumference of the ring, is attached to the latter by means of a circular piece of leather of the exact size of the ring by means of tacks. The ring so constructed is then made to fit snugly into the paste-pot by padding its sides with a strip of thick cloth. Two small staples are then driven on opposite sides part way into the upper edge of the ring, as shown. These serve the purpose of raising or lowering the ring by the aid of the device shown by Fig. 57, which is constructed from a piece of heavy brass wire, its entire length being 9″, that of the handle being 5″. By its aid, the "paste guage" can be depressed from time to time as the paste which has oozed through the meshes in quantity sufficient for the purpose of pasting is consumed, and thus the operator avoids soiling his fingers. To pull out the "paste gauge," the wire implement is grasped by the handle, pressed until the projections in the prongs catch into the staples, when the reversal is accomplished easily. These simple contrivances will doubtless find favor with careful dispensers, as will another, which is shown by Fig. 58, which insures the cleanly application of the paste to the labels. As shown it consists, according to the shape and size of the label, of square, oblong (or round) blocks of wood, provided on the under surface with wooden pegs, by means of which it may be held in position on the counter and rapidly changed as may be required.

FIG. 57.

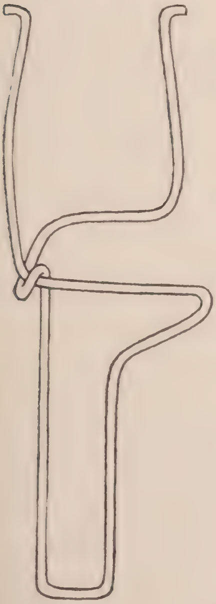
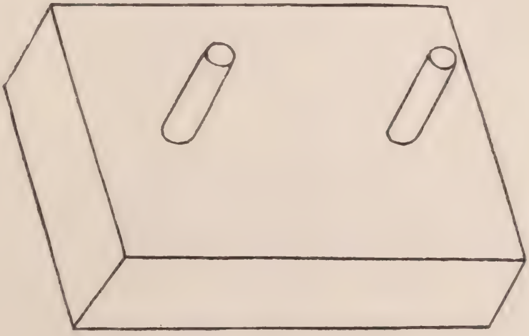


FIG. 58.



Label Pasting Applicances.

The only apparent objection to this device is that a block must be provided for each size and shape of the label; but this objection is removed in great part by the ease with which the change from one block to the other is effected, while the blocks for the labels most in use may have a permanent position. The thickness recommended for these blocks, and the length of the projecting portion of the pegs, is one inch respectively.—Bull. Pharm., June, 1898, 250.

Flour Paste—Good Formula.—John F. Williams recommends the following formula for making a flour paste that will keep any length of time, and never gets watery or sour. It is quite thick, and must therefore be reduced to the required consistency, as it is taken from the stock for use. Take wheat flour, 8 ounces; alum, borax, of each ⅛ ounce; boric acid, oil of sassafras, of each $\frac{1}{16}$ ounce. Mix in a granite-ware dish, using a square redwood paddle. Add all at once cold water 8 ounces, and whip out all lumps; then add concentrated acetic acid 1 ounce (or two ounces of 36-per cent.), and boiling water, all at once, 16 ounces. Place over a hot fire and heat to break the starch globules, indicated by the appearance of a bluish tint and great adhesiveness, stirring constantly to prevent burning. Transfer to a covered jar, and when wanted reduce this with boiling water, about one part of paste to two of water, observing to add the water slowly and boiling hot while whipping smooth.—Bull. Pharm., Sept., 1897, 406; from Proc. Conn. Pharm. Assoc., 1897.

Permanent Library Paste—Formula.—Frank Edel gives the results of experiments made to determine the composition of the library pastes of the market, and suggests a formula for the preparation of a paste identical with those supplied, as follows: White dextrin, 5 or 5½ lbs.; water heated to about 160°, 1 gal.; oil of wintergreen, oil of cloves, of each ½ drachm. Dissolve the dextrin in the water by stirring; when cool add the oils and stir; pour the paste into bottles, cork and place in a cool place, where they may congeal and ripen. The time required for this varies, but the process can be much expedited by placing the bottle containing the paste in a cooling chamber at a temperature of 40 or 45 degrees, when it will ripen in a few days.—Amer. Drugg., June 10, 1898, 309.

ACETA.

Acetum Cantharidis, B. P.—Proposed Preparation from Cantharidin. Greenish and Wilson are led by the results of their investigations concerning *Cantharides*—which see under "Materia Medica"—to suggest the preparation of vinegar of cantharides from the active principle of the flies, as follows: Cantharidin, 1 part; dissolve in glacial acetic acid, 200 fluid parts; add enough diluted acetic acid to make 2000 fluid parts. The strength is based on the assumption that, by the process now official, the whole of the cantharidin would be removed from flies of average strength—containing 5 per cent. of cantharidin.—Pharm. Jour., Mar. 12, 1898, 259.

AQUÆ.

Medicated Waters—Simple and Rapid Method of Preparation.—John K. Williams suggests the following method for preparing all the medicated waters, with the single exception of rose-water, which, being used in eye-lotions, should be distilled from the flowers: Mix equal volumes of the oil, alcohol, and glycerin. Fold two filters together, open out, and with a glass rod—used in mixing the oil in the graduate—spread the thick mixture over the surface of the inner filter; place the filters in a rubber or other funnel capable of resisting heat, and turn in the full quantity of water at near the boiling point. Catch the first filtrate in the graduate in which is the glass rod, and return that to the filter; allow all to pass, and return to the filter two or three times. Camphor is dissolved in its own weight of alcohol in a small mortar, then add the glycerin, and proceed as with the oils. One trial of this will demonstrate the simplicity and rapidity of preparation, as well as the superior quality.—Bull. Pharm., Sept., 1897, 407; from Proc. Conn. Pharm. Asso., 1897.

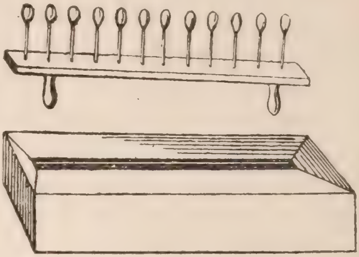
Bitter Almond Water—Correction of the Test of the Phar. Germ.—A. Hood finds that the test of the third edition of the Phar. Germ. to determine the strength of bitter almond water, fails when the water is stronger than officially required. The five drops of potassa solution which are directed to be added to 10 Cc. of water before titration are insufficient; but correct results are obtained when ten drops of potassa solution are added, and he suggests a correction of the test in accordance with this observation.—Apoth. Zeit., 1898, 43.

Aqua Calcinata (Calcaria?) Effervescens—A New Preparation.—Professor W. Joworski recommends an effervescent form of lime-water for the treatment of catarrhal diarrhœas. It is used in two strengths, the *milder* preparation containing in one liter of water supersaturated with carbon dioxide, two grammes each of calcium carbonate and calcium salicylate, while the *stronger* preparation contains in the liter four grammes of the carbonate and three grammes of salicylate. The waters are given in doses of half a glass (100 Cc.), a dose of the stronger before breakfast, and three doses of the milder daily after the customary meals. In a comment upon the title given to this water, attention is called to the incorrect application of the Latin term "calcinata"—meaning "calcined"—which should be replaced by the word "calcaria," denoting that the preparation contains lime.—Pharm. Centralh., Feb. 17, 1898, 108; from Therap. Monatsh., 1898, 74.

CAPSULÆ.

Capsules—Practical Mould and Dish.—A "capsule maker" recommends the mould and dish shown by Fig. 59 as being a better form than those usually employed for making capsules. It takes less room when making large quantities, can be handled just as easily, and the capsules can be pulled off with greater facility. The lower illustration represents the bath for the gelatin solution. It is not a water-bath. The author prefers not to use a water-bath for keeping the solution liquid, but a longitudinal atmospheric burner, turned low down, and placed about a foot below the tin. The partial cover to the tin effectually prevents evaporation of water during the heating—a thing that is not provided for in open dishes. After dipping the moulds in the solution, they are lifted up, and when the drops form, allowed to touch the surface again.—Chem. and Drugg., Febr. 26, 1898, 349.

FIG. 59.



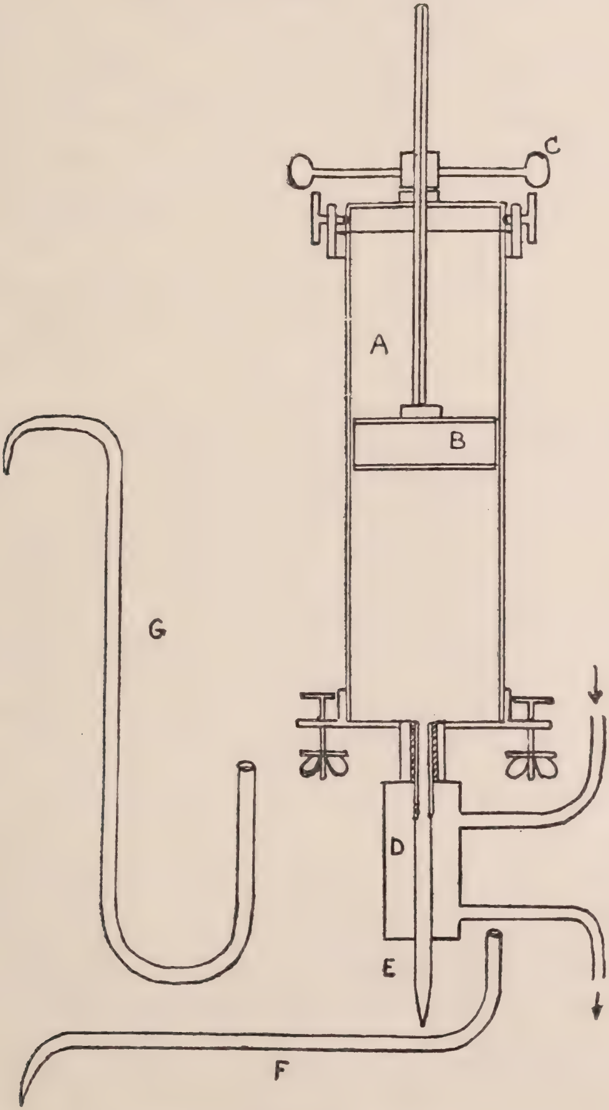
Mould and Dish for Capsules.

Soft Capsules—Making and Filling.—Frank Edel offers some practical suggestions on the making and filling of soft capsules. In experiments he had experienced considerable difficulty, with a satisfactory gelatin mass, to mould them satisfactorily; but on securing some moulds made of tin—in Germany—he had not the slightest difficulty after a little practice. In the summer, however, he found it necessary to have some means of hastening the hardening of the capsules. This he accomplished by means of a rotary fan, working with a pedal. The mass used for this purpose may be the same as that which he had previously used for closing capsules. It is prepared by soaking 25 parts of gelatin in 45 parts of water, adding 10 parts of glycerin and 8 parts of sugar, and dissolving by the heat of a water bath. The moulds should be rubbed with a soft cloth holding enough olive oil so as to leave just a trace of oil on them, the rubbing being some distance up the supporting rod. The gelatin mass having been melted and of a temperature of about 110 degrees, the mould is dipped in and slowly withdrawn, and then rotated so as to distribute the gelatin coat evenly, and when it begins to harden set in a frame in a current of air. As soon as they have become sufficiently firm, the capsules are cautiously removed from the moulds, and then the rough ends cut off by clipping with a pair of shears. The capsules may then be set aside in a suitable frame until perfectly cool, when they are ready to fill. If it is desired to make

Hard Capsules, the glycerin must be omitted. The author also found the following formula satisfactory for making hard capsules: Gelatin, 6 ozs; acacia, sugar, of each, 1 oz; water, 5 oz. Dissolve the acacia in the water, in this soften the gelatin, then add the sugar and heat on a water-bath until solution is effected; remove any scum that arises, and use as directed for soft capsules. Concerning the filling of the capsules, the difficulties experienced by some are possibly due to faulty manipulation. In this operation the author always uses extreme care not to get any oily substances on the edges of the capsules, closing them with a blunt glass rod containing a drop of the gelatin mass used for making soft capsules. —West Drugg., March 1898, 102.

Capsules—A Syringe for Filling.—J. A. Forrest describes a syringe for

FIG. 60.



A Syringe for Filling Capsules.

filling capsules, which is designed particularly for viscid liquids or material of the consistence of a soft extract, requiring more or less pressure. The syringe is shown by Fig. 60. *A* is a brass cylinder of any suitable size.

The piston, *B*, provided with a feathered screw rod passing through the cap of the cylinder, is lowered or raised by turning the wheel, *C*, which carries a key fitting loosely into the slot in the piston rod. The syringe is screwed to a projecting piece of wood, securely fixed to the dispensing counter at a convenient height, by two bolts and nuts. A straight nozzle, *E*, may be used when each capsule is held under it by the fingers, while the projecting nozzle, *F*, is necessary when the capsules to be filled are arranged in a tray, so that the latter may be moved to bring each capsule under it. A further convenience is the curved nozzle, *G*, which is useful if the operator desires to have both hands on the same level—the wheel, *C*, keeping the hand of the operator, from the beginning of the operation until the syringe is empty, on the same level. A water jacket, *D*, bearing two tubes shown at the arrows for the circulation of hot water, is provided so that—in some cases—the liquid to be filled may be gently warmed just at the moment it enters the nozzle, thereby facilitating its flow and entrance into the capsule.—Pharm. Journ. Mar. 19, 1898, 283.

CARBASSUS.

Iodoform Gauze—Method of Assay.—The following method for determining the amount of iodoform is recommended by Schacherl. From 1 to 1.5 Gm. of the gauze is heated under pressure on the water-bath for half an hour in a strong flask with 30 Gm. of a solution of sodium ethylate containing about two per cent. of Na. On cooling, the residue is thoroughly washed with water, the alcohol evaporated off, and the alkaline liquid faintly acidulated with dilute nitric acid. 30 Cc. of $\frac{N}{10}$ silver nitrate solution are then added, and the measure of the liquid carefully adjusted to 200 Cc. by the addition of distilled water. 100 Cc. are filtered off, and the uncombined silver determined in it with $\frac{N}{10}$ ammonium sulphocyanate, using iron alum as an indicator. Each Cc. of $\frac{N}{10}$ silver nitrate solution = 0.01309 gramme of iodoform. Two specimens of gauze said to contain 50 and 30 per cent. were found to give only 14.9 and 6.4 respectively.—Apoth. Zeit., xii., 95.

Iodoform Gauze—Stability.—Astine finds that if iodoform gauze is carefully preserved and kept in the dark it does not materially deteriorate in strength in twelve months. Incidentally he finds in the determination of the iodoform by Gay's method that it is necessary to continue the saponification for at least three hours to ensure that the whole of the iodoform is converted into potassium iodide.—Pharm. Journ., Oct. 2, 1897, 298; from Bull. de Pharm. du Sud-Est, 11, 199.

COLLODION.

Flexible Collodion Preparation with Balsam of Peru.—Dr. Klein recommends the addition of 10 per cent. of balsam of Peru to collodion as an admirable medium for protecting small wounds, since it forms not only an elastic, but a very adherent coating, which is not readily removed by repeated washing.—Therap. Monatsh., 1897, 238.

Collodium Vesicans, B. P.—Preparation with Cantharidin.—Greenish and Wilson propose the preparation of blistering collodion with liquor epispasticus made with cantharidin (which see under "Liquores"), one part of pyroxylin being dissolved in 40 fluid parts of the blistering liquid. The prepartion so made has been tested, and it has been found that when applied to the arm it raises a blister in about eight hours.—Pharm. Journ., March 12, 1898, 259.

Iodized Collodion—Formula for a Depilatory.—The following formula produces an excellent depilatory: Iodine, 7.5 grammes; oil of turpentine, 15 grammes; castor oil, 20 grammes; alcohol, 120 grammes; collodion, 350 grammes. It is applied in thick layers; when the collodion is removed, the hairs adhering to its surface are removed with it.—Pharm. Ztg., xlii., 167.

Collodium Benzoinatum—Formula of the New York Hospitals.—Tinct. benz. co., 60 Cc.; Glycerin, 5 Cc.; Collodion, 120 Cc. For external use.—Amer. Drugg., April 11, 1898, 189.

Juniper Tar Collodion—An Effective Remedy in Psoriasis.—According to "Pharm. Centralh." (xxxviii. 423) a mixture of juniper tar and acetone-collodion is recommended as a specially effective remedy in psoriasis. The remedy is applied by painting, which should be done daily if no irritation sets in. The odor of the tar is covered by the acetone, and the dressing does not soil the linen.

CERATA ET UNGUENTA.

Ointment Bases—Extent of Miscibility with Water, Alcohol and Glycerin.—Arthur St. Onge communicates the results of experiments made to determine the amounts of water, alcohol and glycerin respectively that will be absorbed by different ointment bases, the list embracing a very large variety of animal, vegetable and mineral fats. To find the amount of water taken up by a base, 10 grammes of the latter are triturated in a mortar and water allowed to flow in from a burette as long as it will unite without separating. In the case of glycerin the method is the same, but a correction of its quantity must be made by multiplying the number of Cc. by 1.25, the specific gravity. Owing to the volatility of alcohol, the amount, added in the same way as in the other cases, is determined by weighing the saturated ointment base.—Merck's Rep., Oct. 1, 1897, 601; from New Engl. Drugg.

Benzoinated Lard—Practical Method of Preparation.—Francis Hemm describes an apparatus for the convenient preparation of benzoinated lard according to the official requirement. It consists of a tin bucket or receptacle for the lard, 7″ high, 6¾″ diameter, surrounded by a water jacket having 1⅜″ water space, a closely fitting lid, provided with tubulure and perforated cork; a thermometer, which is inserted through the perforated cork, and a hook attached to the centre of the lid. The jacket is provided with a lateral spout, so that when filled with water through the tubulure, a little of it may be poured out before applying heat. About 3 kilograms of lard being placed into the bucket, the coarsely-powdered benzoin (both of prime quality), is inclosed in a loose bag of muslin, and suspended from the hook in such a manner that it will reach just below the surface of the melted lard. The digestion may then be conducted over any ordinary stove without danger of overheating. The suspension of the benzoin near the surface has the advantage that complete extraction is secured, whereas, by throwing the coarsely-powdered drug into the lard, the particles will agglutinate to the bottom of the vessel and form an impenetrable mass.

The author prefers to use the tincture of benzoin instead of the drug — which, of course, obviates the necessity of suspension — and to evaporate the alcohol by heating for two hours, stirring frequently and finally straining.—Double the quantity of benzoin is also an advantage.—Proc. Mo. Pharm. Assoc., 1897, 85.

Benzoinated Lard—Improved Formula.—Dr. A. R. L. Dohme recommends the following formula for preparing benzoinated lard: Wash 1000 grammes of lard thoroughly with cold water, and press out all adhering moisture as completely as possible; then mix 100 grammes of calcium sulphate with 20 grammes of benzoin, previously powdered with an equal bulk of clean white sand, add the combined powder to the previously melted lard, and keep at a temperature of 115° to 140° *Fahrenheit* for two hours, stirring frequently. Filter warm near fire; afterwards re-melt the filtrate and stir until cold.—Proc. Maryland Pharm. Assoc., 1897, 41.

Benzoinated Lard—Preparation with "Liquid Benzoin."—Richard M. Shoemaker recommends the preparation of "Liquid Benzoin" (which see under Liquores) for the purpose of making benzoinated lard as follows: Melt together 20 Gm. of white wax and 905 Gm. of dehydrated lard; add 15 Gm. of liquid benzoin, and stir until cold. It is a yellowish-white solid, possessing in full the characteristic odor of the volatile proximate principles of benzoin.—Amer. Jour. Pharm., 1898, 10.

Ossalin (Bone Fat)—A New Basis for Ointments.—Stroschein recommends the fat prepared from fresh marrow of fresh beef bones as a basis for ointments which he calls "Ossalin." It is a remarkably mild fat, quite neutral, without irritation to the skin; has a greyish white color, an odor similar to tallow, and is capable of absorbing at least two hundred per cent. of water.—Pharm. Ztg.

Iodovasol—A Stable Iodized Ointment Base.—According to "Pharm. Ztg." (xlii. 63) iodovasol, a new iodized ointment base containing 7 per cent. of iodine, is prepared by treating an excess of oleic acid with iodine chloride, washing the resulting oily liquid with water, then with dilute solution of sodium thiosulphate, and then drying with anhydrous sodium sulphate. The product is then mixed with the necessary quantity of vaseline, a little absolute alcohol is added, and a current of ammonia gas is passed through the mixture until the oleic acid is saturated. The resultant brown liquid is stable, but, being very hygroscopic, must be preserved in well-closed vessels.

Cold Cream—Objection to the Borax in the Formula of the U. S. P., 1890.—F. W. F. Stedem states that since the last revision of the U. S. P. many complaints have been made by physicians regarding the deterioration of ointments of metallic oxides and other medicinal substances when made with Ung. Aquæ Rosæ as the vehicle. His experience with the formula of 1890, into which borax has been introduced to facilitate the incorporation of the rose-water, and with the other formula which contained no such addition, convince him that the deterioration observed is due to the borax. Believing that the borax was introduced simply for the purpose of rapidly making the ointment, and there being no difficulty to make a satisfactory cold cream by the old process, he thinks the borax should be omitted from the pharmacopœial formula, and that it would be far better to drop this preparation entirely from the Pharmacopœia, than to continue it and make it necessary for pharmacists to keep in stock—for the reasons given—the preparations made with and without borax.—Proc. Penn. Phar. Asso., 1897, 86–87.

Cold Cream—Manufacture.—Wm. B. Parker, who has had opportunity to prepare cold cream in large quantities in one of the largest pharmacies of the South, makes some practical remarks on the preparation of cold cream on the manufacturing scale. Using the ingredients of the Pharmacopœia in the proportions of that standard, but in the increased quantities necessary, with the single substitution of distilled water for rose-water, and the subsequent addition of oil of rose, he directs that the oil of almonds be poured into a porcelain lined vessel of sufficient capacity so that the cream may be stirred well. Add the spermaceti and wax to the oil, and heat over a slow fire until melted. Having dissolved the borax in the water, filter the solution through cotton, add to it the melted mixture, and continue the heat for three minutes longer. Then place the porcelain-lined vessel and contents into a larger vessel partly filled with water, arranged so that there may be an inflow of ice-water from a reservoir provided, and, stirring the mixture briskly and constantly until cold and finished, allow the ice water to flow into the outer vessel, to slowly cool off the water, until quite cold. As the cream cools off rapidly in the cold water, the stirring can be conducted without much fatigue. It may be done by mechanical means, however, if the quantities are large enough to justify it, and for this purpose the author describes an apparatus which he has devised, and which is shown by a cut accompanying his paper. An absolute condition to be observed is the purity and prime quality of the ingredients.—Merck's Rep., Dec. 1, 1897, 723.

Unguentum Cantharidis, B. P.—Proposed Preparation with Cantharidin.—Greenish and Wilson suggest that cantharides ointment be made from cantharidin instead of *Cantharides* (which see under "Materia Medica"), the following formula being given: Cantharidin, one part; dissolve in a little chloroform by the aid of heat, and add the solution to a previously melted mixture of 499 parts of yellow wax and 2500 parts of olive oil, with constant stirring, and continuance of the heat of a water-bath until all the chloroform is dissipated. The authors observe that if this preparation is made 1 : 2000 instead of 1 : 3000 as proposed by them, it raises a blister when applied on lint.—Pharm. Journ., Mar. 12, 1898, 259.

Ung. Chrysarobin. Comp.—Unna's Formula for the Hair.—Unna recommends the following formula for a compound chrysarobin ointment to be used in the treatment of the hair: Chrysarobin, 5 parts; ichthyol, 5 parts; salicylic acid, 2 parts; lard, 30 parts; vaselin, 58 parts.—Pharm. Centralh., 1897, 840.

Ointment of Zinc Oxide—Improved Manipulation.—John K. Williams suggests the following method for the expeditious preparation of smooth oxide of zinc ointment: Having sifted the zinc oxide, triturate it with hot castor oil to the amount of 10 per cent. of the fat to be used, in a warm mortar. A smooth paste is quickly obtained, and the 90 per cent. of benzoinated lard may then be incorporated so as to form a perfectly smooth ointment without heat other than the original warmth of the mortar.—Bull. Pharm., Aug., 1897; 408; from Proc. Conn. Pharm. Asso., 1897.

Ceratum Plumbi Sabacetatis—Use of Wool-fat as Base.—Frederick A. Haussmann, in connection with his criticisms on "Liquor Plumbi Subacetatis" (which see under "Liquores"), speaks of Goulard's cerate as being probably the most unsatisfactory official preparation used for inunction. Besides the liability of the cerate becoming rancid on the shelves of pharmacists who are compelled to keep it in stock, there is the inevitable deterioration due to saponification, which is often hastened by the addition of the solution of lead subacetate to the *melted* camphor cerate, to facilitate admixture, instead of, as officially directed, effecting their admixture in the cold. The ease and rapidity of incorporating the solution with the melted cerate is the principal temptation; but it is not easier or more ex peditious than the incorporation of the solution with hydrated wool-fat, commercially known as Adeps Lanæ. Made with this in the proportions of the U. S. P., the product closely resembles lanolin in appearance, has a satisfactory therapeutic action, and has not shown any signs of deterioration after two months' standing. The disadvantage of this substitute for Goulard's cerate may be found in the ropy consistence of the ointment base, and that in consequence satisfactory inunction cannot be accomplished unless the ointment is warmed. The author also recommends the following rough

Valuation of Goulard's Cerate.—Shake 2 grammes of the cerate in a half-ounce homeopathic vial with 10 Cc. of chloroform, until the fat is dissolved by the latter. If the cerate is of recent preparation, the lower of the two layers formed will be but slightly milky and free from precipitate. If an old, rancid or ropy cerate is similarly treated, a white precipitate will be found, and the chloroform solution of the cerate will be more or less discolored according to the degree of change which the cerate has undergone.—Amer. Jour. Pharm., Nov., 1897, 575–577.

Mercurial Ointment — Commercial Inferiority. — Prof. Frederick J. Wulling communicates the results of an examination of fifteen samples of mercurial ointment purchased at different retail stores, in a table as follows:

No.	Percentage of Residue	Percentage of Mercury.	Percentage of Foreign Insoluble Bodies.	Percentage of Foreign Soluble Bodies.	Name of Adulteration.
1	33.9	33.	0.	......	......
2	24.3	24.	0.	......	......
3	15.6	10.4	5.2	......	......
4	10.9	10.9	0.	......	......
5	18.	3.5	14.5	......	Slate or bluestone and lamp-black.
6	20.3	20.	0.	......	......
7	16.2	16.2	0.	.....	......
8	41.7	40.9	0.	......	......
9	22.	19.4	0.	......	......
10	8.6	8.	0.	......	......
11	......	7.2	1.5	20.	Charcoal or lamp-black and sulphur.
12	49.7	49.1	0.	......	......
13	2.1	0.	2.1	......	Lampblack.
14	25.4	25.	0.	.....	......
15	24.3	23.1	0.	......	......

The method pursued, which is more practical, accurate and convenient than the older method of separating the mercury by melting the ointment, is as follows: Two grammes or less of the ointment are placed upon a small piece of tared filter paper and then put into the tube of a Soxhlet extraction apparatus in a way that the mercury will be retained as the extraction goes on. The fat is extracted by means of benzin in the well known manner. The use of a Soxhlet apparatus is however not absolutely necessary, but simply a convenience. Simple digestion with fresh quantities of benzin and weighing the final residue may be made to answer. Foreign impurities are determined by treating the residue with nitric acid and estimating the mercury in the solution obtained.—Merck's Rep., April 15, 1898, 234.

Mercurial Ointment—Simple and Expeditious Method of Assay.—The following simple and rapid method for determining the amount of metal in mercurial ointment is described by Fonzes-Diacon. A weighed quantity of the ointment is placed on a tared filter and so placed in a Soxhlet extraction apparatus, that the open part of the paper is under the delivery tube of the condenser. The whole is then extracted with ether, and when all the fatty matter is removed, the filter is withdrawn from the apparatus, cautiously dried, and the mercury weighed. The same method is applicable for the quantitative determination of any substance insoluble in ether contained in an ointment.—Pharm. Jour., Sept. 11, 1897, 251; from Bull. de Pharm. du Sud-Est, ii., 198.

Mercurial Ointment—Commercial Quality.—Charles H. La Wall has examined a number of samples of mercurial ointment from reputable manufacturers, and found the percentage of metallic mercury in every case to approximately agree with the amount claimed upon the label.—Amer. Jour. Pharm., Dec., 1897, 621.

Pine and Lanoline Ointment—Formula.—The "Cincinnati Academy of Pharmacy" publishes the following formula for a pine and lanoline ointment: Hydrous wool-fat, 27 grammes; white petrolatum, 45 grammes; white wax, 23 grammes; oil of pinus sylvestris, 4 Cc.; oil of juniper, 1 Cc. Melt the solid ingredients on a water bath. Allow to partially cool; stir in the oils and continue until a uniform smooth ointment is formed. An agreeable and pleasant ointment for eczema, scabies, etc. A formula for an

Improved Ointment of Yellow Mercuric Oxide is also given as follows: Yellow mercuric oxide, freshly prepared, 10 grammes; distilled water, a sufficient quantity; hydrous wool-fat, 25 grammes; soft petrolatum, a sufficient quantity to make 100 grammes. Prepare yellow mercuric oxide, using 13 grammes of corrosive mercuric chloride and 5 grammes of soda, and following the directions given in the United States Pharmacopœia. Be sure that all the trace of chloride is removed. Allow the precipitate to drain, transfer the magma to a porcelain mortar and triturate in its moist state, adding a little distilled water if necessary to make a thin paste. Then add first the hydrous wool-fat, triturating until a perfectly smooth mixture results; then gradually incorporate the petrolatum and mix thoroughly. The ointment so prepared contains 10 per cent. of yellow mercuric oxide and is perfectly free from grit. To make the 2 per cent. ointment take of this ointment 20 grammes and add a sufficient quantity soft petrolatum to make 100 grammes, and thoroughly mix together. This strength (2 per cent.) is suitable for application in inflammation of the eye.—Amer. Drugg., March 10, 1898, 130.

Ointment of Yellow Oxide of Mercury—Preparation.—Schweissinger recommends the preparation of yellow oxide of mercury ointment from recently-precipitated oxide, using the calculated quantity of mercuric chloride and precipitating this with sodium hydrate solution in the usual manner. The carefully washed precipitate is drained and, when almost dry, is intimately mixed with the fatty bases, using the latter in the proportion to make an ointment of the exact strength by allowing for the small amount of the mixtures retained by the oxide. The process is the only reliable one to secure a finely-divided ointment.—Zeit. Oest. Apoth. Ver., 1898, 6.

Lanolimenta—Semi-Official Formulas.—In the "New Supplement" (1897) to the third edition of the German Pharmacopœia, the following formulas are given:

Lanolimentum Boroglycerini: Dissolve 20 parts of boric acid in 100 parts of glycerin and 50 parts of water, and incorporate the solution with 350 parts of wool-fat and 130 parts of olive oil.

Lanolimentum Leniens (*Wool-fat Cream*): Melt together 20 parts of spermaceti and 60 parts of vaseline, allow to become half cooled, and mix with 80 parts of wool-fat and 100 parts of water to form a cream, which is perfumed by the addition of one drop of oil of rose to each 50 grammes.— —Pharm. Jour., Oct. 23, 1897, 360.

Boroglycerin and Lanolin Ointment—Formula.—The following formula for a boroglycerin ointment is given in Pharm. Ztg. (xlii., 235): Dissolve 8 parts boric acid in 50 parts of glycerin, and incorporate the solution with 120 parts paraffin ointment and 60 parts anhydrous lanolin.

Ointments—Various Formulas.—The following ointment formulas are given in the recent (fifth) edition of the New York Hospital Formulary, edited by Dr. Charles Rice, and will probably prove convenient for reference here:

Unguentum Acetanilidi Compositum: Acetanilid, 2 parts; calomel, 1 part; bismuth subnitrate, 2 parts; ointment zinc oxide, sufficient to make 16 parts.

Unguentum Anti-Hæmorrhoidale—(*Pile Ointment*):—Morphine oleate (10 per cent.), 1 part; camphor, 2 parts; oil of sassafras, 4 parts; resin, 8 parts; yellow wax, 16 parts; benzoinated lard, 24 parts. Melt the wax, resin and benzoinated lard together at a gentle heat, then digest the camphor with the mixture until it is dissolved, allow it to cool and, before it solidifies, add the oleate of morphine and oil of sassafras, and mix thoroughly.—To be applied on lint.

Unguentum Iodoformi et Bismuthi Compositum.—Iodoform, bismuth subnit., of each 4 parts; acid carbolic, 1 part; bals. peru, 12 parts; zinc ointment, 32 parts; petrolatum, sufficient to make 64 parts.

Unguentum pro Rheumatismo:—Acid salicylic, oil of turpentine, hydrous wool fat, of each 1 part; lard, 8 parts.

Unguentum Resorcini et Zinci (*Taylor's Ointment*).—Resorcin, 4 Gm.;

zinc oxide, powd. starch, of each 25 Gm.; petrolatum, sufficient to make 100 Gm. (See some remarks concerning the proper admixture of resorcin in this and similar ointments under the heading of *Resorcin*, under "Organic Chemistry," Rep.).

Unguentum Salicylicum (*Lassar's Ointment*):—Acid salicylic, 2 parts; powd. starch, 8 parts; zinc ointment, 90 parts.—Amer. Drugg. June 10, 1898, 310.

Ointments—Formulas for Winter Use.—Frank Edel recommends the following formulas for salves which are particularly useful for winter sales:

Healing Salve, No. 1—Camphor, 1 oz.; zinc oxide, 8 ozs.; paraffin, 4 ozs.; petrolatum, 40 ozs. Dissolve the camphor in the petrolatum by reducing it to small pieces and keeping the petrolatum liquid and agitating frequently; then add the paraffin in a melted state, allow to solidify, then incorporate the zinc oxide.

Healing Salve No. 2 is made by appropriately combining the following ingredients: Resin, beeswax, zinc oxide, of each 8 ozs.; Venice turpentine, 4 ozs.; lard, 32 ozs.; tannin, ½ oz.; oil of sassafras, ½ oz.

Lanolin Cold Cream, superior to anything the author has tried, is made by the following formula· Lanolin (Liebreich), 2 ozs.; petrolatum, glycerin, of each 6 ozs. Rub the lanolin and petrolatum in a mortar, then add the glycerin gradually and perfume to suit. This is easily made, and, besides, keeps perfectly.—West. Drugg., Dec., 1897, 557.

Eczema Ointment for Dogs and Cats—Formula.—Edward Swallow recommends the following formula for an eczema ointment for dogs and cats: Zinc oxide, bismuth subcarbonate, of each 1 drachm; calamine, 30 grains; petrolatum, lanolin, of each 1 ounce. To be applied once a day after washing with curd soap and gently drying the animal. In cases of ringworm in dogs, a daily application of decolorized tincture of iodine until the edges begin to rise, then bathing and dressing with simple cerate, is recommended.—Amer. Drugg., April 11, 1898, 187.

ELIXIRES.

Elixirs—Improved Formulas.—Dr. A. R. L. Dohme, in a report to the Maryland Pharmaceutical Association, recommends the following formulas for endorsement or criticism:

Elixir of Phosphate of Iron, Quinine and Strychnine: Soluble phosphate of iron, U. S. P., 128 grains; quinine, alkaloid, 65 grains; strychnine, alkaloid, 2 grains; phosphoric acid, 85 per cent., 15 minims; acetic acid, 36 per cent., 225 grains; ammonium carbonate, 71 grains; alcohol, 1 fluid ounce; aromatic elixir, distilled water, of each sufficient to make 16 fluid ounces of finished preparation. Dissolve the alkaloids in the alcohol, add 6 fluid ounces of aromatic elixir, and then the phosphoric acid. Add the ammonium carbonate to the acetic acid, and when solution is complete, add enough distilled water to bring the volume up to 6 fluid drachms. Mix this solution with the solution of the alkaloids, and then add sufficient aromatic elixir to make the liquid measure 14 fluid ounces. Dissolve the iron salt in one-half fluid ounce of distilled water by the aid of gentle heat, and if the solution be acid to test-paper, neutralize exactly with ammonia water; add enough aromatic elixir to this to bring the volume to 2 fluid ounces, and then add to the solution previously obtained, and mix.

Elixir of Pepsin, Bismuth and Strychnine.—Pepsin in scales (U. S. P.), 64 grains; strychnine, 2 grains; tartaric acid, 2 grains; distilled water, 4 fluid ounces; glycerin, 2 fluid ounces; glycerite of bismuth and sodium tartrate (see Caspari's Pharmacy), 2 fluid ounces; caramel, 4 drops; aromatic elixir, 8 fluid ounces. Dissolve the pepsin in a mixture of one fluid ounce each of glycerin and water. Dissolve the strychnine by the aid of the tartaric acid in two and one-half fluid ounces of water, then add the remainder of the glycerin, the glycerite of bismuth, the caramel, and the aromatic elixir, and, finally the solution of pepsin.—Proc. Maryland Pharm. Assoc. 1897, 39–40.

Elixirs—Approved Formulas.—The "Cincinnati Academy of Pharmacy" publishes the following formulas for elixirs:

Compound Aletris Elixir.—Aletris, gaultheria, of each 60 grammes; catnip, cramp bark, of each 30 grammes; blue cohosh, 15 grammes; cinnamon, 7.5 grammes; Bitter orange peel, 3.75 grammes; Caraway, 1.875 grammes; sugar, 300 grammes; alcohol, 312 Cc.; water, a sufficient quantity to make 1000 Cc. Reduce the drugs to a moderately coarse powder and percolate in the usual manner with a mixture of an equal volume of water and the alcohol. Follow with water until 800 Cc. of percolate are obtained. Dissolve the sugar in this percolate and add enough water to make the product measure 1000 Cc., then filter.—A uterine tonic. Dose one or two fluid drachms.

Diuretic Elixir.—Buchu, 75 grammes; juniper, cubeb, of each 15 grammes; bitter orange peel, 12 grammes; coriander, cassia buds, of each 6 grammes: anise, caraway, of each 2 grammes; cardamon, 0.7 gramme; potassium acetate, 90 grammes; spirit of nitrous ether, 90 Cc.; sugar, 240 grammes; alcohol, water, of each a sufficient quantity to make 1000 Cc. Reduce the drugs to a moderately coarse powder, and percolate in the usual manner with a mixture of one volume of alcohol and two volumes of water until 1100 Cc. are obtained. Evaporate on a water bath to 700 Cc., and dissolve in this the potassium acetate, spirit of nitrous ether and sugar. Filter and add enough water through the filter to make 1000 Cc. An excellent diuretic. Dose, one to four fluid drachms.

Compound Elixir of Cinchona (Sims' Elixir of Calisaya).—Yellow cinchona, 30 grammes; sweet orange peel, 15 grammes; Ceylon cinnamon, coriander, of each 7.5 grammes; anise, cardamon, caraway, of each 1.875 grammes; cochineal, 2.5 grammes; brandy, alcohol, syrup, of each 310 Cc.; water sufficient to make 1000 Cc. Reduce the solids to a moderately coarse powder, and percolate in the usual manner with the brandy and diluted alcohol until 700 Cc. are obtained. Add the syrup and filter. A tonic of great merit. Dose, one or two teaspoonfuls.—Amer. Drugg., Mar. 10, 1898, 129.

Elixir Ferri et Arseni Amarum (Tutzel's Elixir)—Formula of the New York Hospitals.—Tinct. citrochlor. of iron, 125 Cc.; quinine sulph., 17.5 Gm.; strychnine sulph., 0.13 Gm.; sodium arsenate (dried at 100° C. until it ceases to lose weight), 0.34 Gm.; alcohol, 30 Cc.; elix. aromat. sufficient to make 1000 Cc.; dose, 1 fluid drachm.

Elixir Vitae, of the same authority, is made by the following formula: Syr. iodide of iron, 10 Cc.; syr. hypophosphites, 10 Cc.; glycerin, 10 Cc.; water, sufficient to make 120 Cc.; dose, 1 fluid drachm.—Amer. Drugg., April 11, 1898, 189.

Elixir Terpin Hydrate and Codeia—Formula.—H. W. Preissler communicates the follewing formula for an Elixir of Terpin Hydrate and Codeia, which is freely prescribed by physicians in his locality and furnishes a nice preparation: Take of terpin hydrate, 192 grains; codeine, 32 grains; alcohol, 5 fluid ounces; glycerin, syrup, of each, 2 fluid ounces; compound spirit of orange, 1 fluid drachm; distilled water, sufficient to make 16 fluid ounces. The terpin hydrate and codeine are dissolved in the alcohol, the glycerin, syrup and spirit of orange added, and the measure then brought to 16 fluid ounces with water. Each fluid drachm contains 1½ grains terpin hydrate and ¼ grain codeine.—Proc. Ky. Pharm. Assoc., 1897, 33.

EMPLASTRA.

Belladonna Plasters—Alkaloidal Assay.—Carl E. Smith suggests some improvements on the published method (of S. W. Williams and C. E. Parker), for assaying commercial belladonna plasters, for which some deviation from the usual methods of assay becomes necessary owing to the presence of rubber. The plaster is cut in strips and the mass disintegrated and partially dissolved by stirring with chloroform made alkaline with ammonia water. The chloroform mixture is decanted and the cloth washed with successive small quantities of chloroform. The rubber is precipitated from the chloroform with alcohol, the solution decanted and the rubber redissolved with chloroform and reprecipitated with alcohol several times so as to recover any alkaloid retained in it. The alkaloid is then washed out from the united alcohol-chloroform solutions with acid water, the acid solution of alkaloid is made alkaline with ammonia, shaken out with chloroform, the chloroform distilled off and the residual alkaloid titrated with acid. The method, which is given in detail, has been critically tested and proved accurate. Applied to ten

American samples of porous belladonna-plasters and to one foreign sample—the latter with some modifications—the result from a uniform square of 5x7½ inches of each of the plasters is shown in the following table :

No.	Weight of Mass in one plaster, 5 x 7½ in.	Per cent. of Alkaloid in Mass.
1	8.55 grammes.	0.586; 0.594; 0.587; 0.571
2	8.7 "	0.407; 0.403; 0.400; 0.416
3		0.509; 0.497.
4	8.65 grammes.	0.112; 0.108.
5		0.103; 0.110.
6	8.2 grammes.	0.060; 0.058.
7	7.35 "	0.084; 0.081.
8	3.25 "	0.125; 0.116.
9	8.35 "	0.098; 0.101.
10	5.7 "	0.042; 0.047.
11		0.095; 0.093; 0.096.

All the samples responded readily to Vitali's test for solanaceous alkaloids, except the foreign sample, No. 11, probably from the presence of some interfering impurity not removed by the process adopted. The results show a want of uniformity in the thickness of the plaster spread, and a very decided difference in the percentage of alkaloid contained in the mass.—Amer. Jour. Pharm., April, 1898, 182–189.

Emplastrum Cantharides, B. P.—Proposed Preparation with Cantharidin.—Greenish and Wilson's experiments upon *Cantharides* (which see under "Materia Medica"), lead them to suggest the following formula for blistering plaster : Dissolve 1 part of cantharidin in a small quantity of chloroform by the aid of heat, and add the solution to 999 parts of a mixture of equal parts of yellow wax, prepared suet, and resin, previously melted in a water-bath, and stir well. Continue the heat till the chloroform is dissipated, and stir till cold. This yields an excellent preparation, easy to spread, blistering well in the experience of the authors in from 5 to 6 hours, and separating well from the blister produced. The authors also recommend that

Emplastrum Califaciens, B. P., be prepared from cantharidin instead of from the flies in substance, as now official, the following formula being recommended : Cantharidin, 1 part ; dissolve in a small quantity of chloroform by the aid of heat, and add the solution to olive oil, 199 parts ; then add this mixture to 4800 parts of resin plaster, previously melted on a water-bath, and stir well. Continue the heat till the chloroform is dissipated. On trial, this plaster has been found to cause redness, but not to blister.—Pharm. Journ., Mar. 12, 1898, 259.

Mustard Plaster—Direction for Extemporaneous Preparation.—The

"Dietetic and Hygienic Gazette" gives the following simple directions for making a mustard plaster at the bedside: Before commencing to mix the paste have all the necessary material at hand, remembering never to place a cold plaster on a patient—the shock is like a sudden plunge in cold water. First put a large plate where it can get warm, though not *hot*. Then stir the mustard and flour thoroughly together before adding the water, which should be tepid. Enough water should be added to make a paste about the consistency of French mustard, stirring being continued during the addition. Place the cloth (an old handkerchief is best) on the warm plate, and spread the paste in the middle of it, leaving a margin sufficiently wide to lap well on all sides. Do not remove the plate until ready to apply to the patient. After it is applied place a folded cloth over it, so as to protect the patient's clothing.—Bull. Pharm., June, 1898, 268.

EMULSA.

Emulsions—Necessity for Pharmacopœial Recognition.—John K. Williams condemns the omission in the U. S. P. 1890, of any mention or method of emulsifying either fixed or essential oils, when preparations of this sort are called for daily both on prescription and verbal orders. Concerning the so-called "continental" method of emulsifying such oils as wintergreen or oil of turpentine, he observes that it is advantageous to add about five per cent. of castor oil to the volatile oil, which secures better emulsification when the water is added. He also describes a cheap and efficient "emulsifier," which is made out of the long, narrow tin can in which nitrous ether is packed. A wooden cover, dasher and handle are fitted on the principle of the old-fashioned churn. For larger quantities of emulsion an earthenware crock may be so provided. It is quite possible to effect emulsification in large or small quantities. An example is given in the following formula for

Emulsion of Cod Liver Oil.—Three ounces of powdered acacia; any desirable flavoring oil; cod-liver oil, one pint. Put all in the dry churn, then stir with a spatula to mix merely; then add all at once 9½ fluidounces of water, put in the dasher and churn away, observing to keep the dasher under the fluid while working it. The union is almost instantaneous, but it is best to continue the churning for a few minutes while in this thick state, to whiten the resultant emulsion. After this add, without care, churning in the meantime, the remainder of the water or other fluids. Bull. Pharm. Sept. 1897, 406; from Proceedings Conn. Pharm. Assoc. 1897.

Emulsions—Estimation of Oils.—The following method for the estimation of the amount of oil in emulsions is recommended by Aug. Schneegans as reliable: 300 parts of the oil-gum emulsion are evaporated with 50 parts of bolus alba and coarse sand. Toward the end of the operation 50 parts of anhydrous sodium sulphate are added, and the mixture evaporated to dryness while stirring. The mass is powdered and extracted with ether in an extraction apparatus, the solvent evaporated, and the residual oil weighed. Emulsions made by means of egg-yolk are heated for some time at a temperature of 100° C. in a stoppered flask. By this means, the albuminous constituents of the yolk are coagulated, and the cloudy fluid may then be readily shaken out with ether. In the latter case, however, it must be remembered that the lecithin of the yolk also dissolves, and that hence allowance must be made for it in the final result. Emulsions made from seeds cannot be treated by the method last mentioned, but may be examined by the oil-gum method.—Merck's Rep., March 15, 1898, 182; from Chem. Ztg., Jan. 1898, 12.

Compound Emulsion of Cod Liver Oil (*Egg Emulsion of Cod Liver Oil with Creosote and Iron*)—*Approved Formula*.—The "Cincinnati Academy of Pharmacy" publishes the following formula for a compound cod liver oil emulsion: Cod liver oil, 334 grammes; yolk of egg (about 12), 300 Cc.; creosote, 22 Cc.; blanched sweet-almonds, 40 grammes; brandy, 150 Cc.; solution of peptonate of iron (which see under "Liquores"), 100 Cc.; oil of bitter almonds, oil of lemon, of each 10 drops or 0.35 Cc.; distilled water, 80 Cc.; syrup, a sufficient quantity to make 1000 Cc. Rub the almonds to powder, add water gradually to make a smooth paste; to this add the creosote, emulsify, add balance of water, and strain. Beat the yolk of egg with the brandy and gradually add the oils; emulsify, add the creosote mixture and then the solution of peptonate of iron. Agitate thoroughly and add sufficient syrup to make 1000 Cc. This preparation should be freshly prepared as wanted.

Palatable Emulsion of Castor Oil is prepared according to the same authority, as follows: Castor oil, 480 grammes; white of egg, 100 Cc.; sugar, 250 grammes; oil of cinnamon, 1 Cc.; water, a sufficient quantity to make 1000 Cc. Emulsify the oils in a mortar with the white of egg and 100 Cc. of water. Dissolve in this the sugar, strain through a wetted straining cloth, and add enough water to make 1000 Cc. Like the first mentioned emulsion, it should be prepared fresh when wanted. It affords an excellent mode for the administration of the oil.—Amer. Drugg., March 10, 1898, 129.

EXTRACTA.

Extracts—The Dry Form to Replace the Pilular.—Pruys criticises the retention of extracts of soft consistence in the Germ. Pharm. unfavorably. They are either liable to become soft, semi-liquid and moldy, or they become dry and unmanageable on keeping. Modern advancements seem to demand more permanent preparations. Possibly the proposition made at the recent Pharmaceutical Congress at Brussels that *dry* extracts only should be officially prepared and dispensed, may prove a way out of the difficulty. To prepare such, however, so that they may be accurate rep resentatives of the drug, the evaporation should be conducted *in vacuo*.—Pharm. Ztg., Sept. 22, 1897, 650.

Solid Extracts—Superiority of the "Alcoholic" over those prepared from Plant Juices.—In a note on some of the official extracts, E. H. Farr and R. Wright observe that one of the greatest drawbacks in connection with many of the official extracts is that they are so overloaded with inert matter that in order to produce the characteristic effect of the drug represented, it is necessary to administer the extract in excessively large doses. For some time past they had suspected that this fault was more especially characteristic of the green extracts prepared from juices, and their suspicions were strengthened by an examination of some of the official juices (see Proceedings 1897, 441–442), which had shown that at least two of them—henbane and hemlock—were lamentably deficient in strength, as well as by some remarks made by Mr. Umney—when the subject was under discussion at the Liverpool meeting of the Br. Pharm. Confer. (see Yearbook of Pharm., 1896, 295), who stated that on pressing out the juice of a considerable quantity of *Aconitum Napellus*, he found the juice to contain practically no aconitine, while the marc yielded nearly all that was contained in the drug. The authors have conducted and publish the results of a comprehensive series of experiments which prove very conclusively that what is true of aconite also holds good with regard to other medicinal plants containing alkaloids: and that in expressing the juices from the fresh plant a quantity of alkaloid, amounting on an average to at least 50 per cent. of the whole, is left in the marc. The results are minimized in three tables, the first showing the percentage of alkaloid and extract yielded by alcoholic tinctures of the dried drugs prepared in the proportion of 1 part of drug to three of finished tincture. The second table shows the percentage yield of alkaloid, dry extracts, etc., by methods given in detail, in commercial juice extracts; while the third table, which is given below, shows the average percentage, moisture, and dry extract in six samples of each of the juice extracts, and the average percentages of alkaloids, moisture, and dry extracts and two samples of each of alcoholic extracts, as well as the average yield of the latter—the figure (1) following the name indicating a juice extract, whilst the figures (2) and (3) denote alcoholic extracts. A 70 per cent. menstruum was employed in the production of all the alcoholic extracts, with the exception of colchicum, for which diluted alcohol was used for one kind, and alcohol with 1 per cent. of acetic acid for the acetic extract.

EXTRACT.	Alkaloid per cent.	Mixtures per cent.	Dry Extract per cent.	Yield of Extract per lb.
Aconite (1)	.43	24.4	75.6	
" (2) Leaf	.60	17.0	83.0	2½ ozs.
" (3) Root	2.44	20.8	79.2	4 "
Belladonna (1)	.98	26.2	73.8	
" (2)	2.86	20.2	79.8	4 "
Conium (1)	.40	25.8	74.2	
" (2)	.30	17.7	82.3	2½ "
" (3 Fruit	8.13	18.6	81.4	
Colchicum (1)	1.01	24.2	75.8	
" (2) Corm	1.67	20.5	79.5	2¾ "
" (3) Seed.	3.16	18.2	81.8	2 "
Colchicum, Acetic (1)	.93	26.6	73.4	
" " (2) Corm. .	1.67	19.3	80.7	2¾ "
" " (3) Seed. .	2.93	17.7	82.3	3 "
Hyoscyamus (1)	.15	26.6	73.4	
" (2)	.30	18.0	82.0	4 "
Stramoninm (1) Leaf	1.54	19.4	80.6	2 "
" (2) Seed	2.73	16.8	83.2	

The authors conclude that there can be no reasonable doubt as to the superiority of the alcohol extracts over those at present official, with which they compare very favorably in appearance and aroma, and over which they have the advantage of superior strength, and consequent smaller dose. Good, carefully dried medicinal herbs are easily obtained in almost any amount, and they cannot see any reason for continuing the preparation of extract from the juices of plants, or indeed, from the fresh plant at all.—Pharm. Jour., Dec. 11, 1897, 517–519.

Alcoholic Extract of Belladonna—Observation of Crystals of Cane Sugar in an Old Sample.—A. J. Dey, on examining a sample of alcoholic extract of belladonna which had been standing a few years and had become quite granular, found it to be full of crystals which proved to be cane sugar. It is not known whether the presence of this sugar is a natural or added constituent. The only record of a similar observation is that of Dunston and Ransom (Ph. Jour. (3), xvi. 777), who mention that the extract contained much dextrose.—Pharm. Jour., Feb. 19, 1898, 179.

Extract of Colchicum.—Percentage of alkaloid in ordinary and in the acetic extract. See

Colchicum Seed, under "Materia Medica."

Extract of Ergot—Adulteration with Elderberry Juice.—Cepellini observes that elderberry juice is occasionally used to adulterate medicinal extracts. He has determined that it may be added to extract of ergot to the amount of 30 per cent. without impairing the odor or taste, nor the characteristic formation of trimethylamine when alkali is added to the solution. If 1 Gm. of the suspected extract is dissolved in 6 Cc. of water and 30 drops of sulphuric acid, and the solution is well shaken with 10 Cc.

of oil of turpentine, two layers of liquid are obtained upon filtration through paper saturated with oil of turpentine, the upper layer being colorless and the under layer of the color of Malaga wine if the extract is normal. In the presence of elderberry juice, however, the upper (oil of turpentine) layer will have a green-yellow color, more or less deep according to the amount of the adulterant, and the lower layer will be a lighter red in color. Elderberry juice to the amount of 10 per cent. and upwards may in this way be detected, not alone in extract of ergot, but in extracts generally.—Pharm. Centralh., May 19, 1898, 353; from Boll. Chim. farmac., 1898, 263.

Extract of Licorice—Method and Result of Examination of the Commercial Powder.—Calvin O. Kinzey observes that powdered extract of licorice is adulterated with starch, pea meal, sugar, &c., that the published methods for the examination of the extract are rather vague and unsatisfactory, and that no effort seems to have been made to establish a standard amount of glycyrrhizin as a requirement of a good extract. Confronted with these unsatisfactory conditions, he has made some experiments and recommends a method of analysis which is briefly as follows: The

Moisture is determined by drying a weighed quantity of the extract in a porcelain crucible in an air-bath to constant weight at between 100° and 110° C. The

Ash is determined by incinerating the residue so obtained at a low redness over a Bunsen burner until the weight remained constant. The

Insoluble Matter was ascertained by exhausting one gramme of the extract with a *solvent* composed of 40 volumes of official ammonia water, 240 volumes of official alcohol, and sufficient water to make 1000 volumes. The extract is stirred occasionally in a beaker with 25 Cc. of this solvent during an hour, then allowed to settle during twelve hours, the clear liquid decanted upon a balanced filter, the residue treated with 5 Cc. more of the solvent, allowed to settle again, decanted as before, and the insoluble matter then also transferred to the filter and worked with the solvent until the washings pass colorless. The filters and residue are then dried in an air bath at 100° to 110° C. The *Glycyrrhizin* is determined in the filtrate by acidifying it with dilute sulphuric acid, collecting the precipitate upon balanced filters, washing with water acidulated slightly with acetic acid until all the sulphuric acid is washed out, and drying the filters at a temperature not exceeding 105° C. The results obtained by the author are as follows, and are quite instructive:

Brand.	Moisture.	Ash.	Insoluble Matter.	Glycyrrhizin.
Spanish...........	6.52	3.70	36.52	6.40
Greek	6.26	8.18	22.06	14.39
Spanish...........	5.00	5.51	25.54	10.75
American	5.62	6.79	12.27	7.63
Spanish...........	7.08	6.52	29.20	5.28
Spanish..........	6.96	6.56	20.35	10.41
Greek	6.71	7.82	9.65	18.59
———	7.96	5.77	15.21	8.90
———	8.25	5.54	7.40	27.78
———	8.46	4.67	19.41	9.50
———	9.10	6.76	11.12	8.94
———	5.78	7.49	5.95	11.63

The solvent recommended by the author is preferred to the ammoniacal waters usually employed for the extraction of the glycyrrhizin because it seems to have the power—due to the alcohol in it—of coagulating the starchy matter in the extract, which, with water alone, will close up the pores of the filter and impede filtration.—Amer. Jour. Pharm., Jan., 1898, 23-25.

Licorice Mass—Method of Analysis.—Alfred Mellor communicates a process for the analysis of licorice mass which has been adopted by large consumers and manufacturers. The *moisture* is determined in two grammes of the mass by heating it in a water-oven until hard, breaking it up into small fragments, and then heating until constant in weight. The *mineral matter* is determined in the so dried sample by incinerating to white ash. The *insoluble substance* is determined in 5 grams solution in 100 Cc. distilled water, subsidence for twelve hours, decantation through a tared filter, collection of sediment in same by rinsing with cold water, collection of a sediment which forms in filtrate on a second tared filter, and determining their united weight. To determine the *gummy matter* the same quantity of mass is dissolved in 50 Cc. of distilled water. 100 Cc. of 95 per cent. alcohol is added, the precipitate after standing over night collected in a tared filter, washed with a mixture of 2 parts of alcohol and 1 part of water, and its weight ascertained by drying to constant weight, deducting the weight of the insoluble substance previously ascertained. The alcoholic filtrate from this operation is concentrated to 30 Cc., transferred to a beaker with the aid of 20 Cc. of water, and the *Glycyrrhizin* precipitated by adding 12 drops of sulphuric acid diluted with 5 Cc. of water. After standing one night, the glycyrrhizin is washed by decantation, and dried to constant weight—one drop of concentrated ammonia water being added to neutralize any acid remaining. In the decanted liquid the *Saccharine Matter* is determined by means of Fehling solution, the liquid having been previously neutralized with barium hydrate and then filtered. The sum of the percentages of the several substances so ascertained, when deducted from 100, then gives the percentage of *Extractive Substance.*—Amer. Jour., March, 1898, 136–137.

Acetic Extract of Ipecac, B. P.—Addition of a little Glycerin.—Thomas Dunlop, in view of the widespread dissatisfaction and his personal doubts as to the propriety of the B. P. directions to evaporate the acetic extract of ipecac to dryness, has made some experiments which seem to point out that the chief objection to the requirement is the difficulty of removing the dried extract from the vessel in which it has been evaporated, and its subsequent tendency to attract moisture. To overcome the principal difficulty he had added one drachm of glycerin when the (nearly finished?—Rep.) extract had been reduced to between one and two ounces, the resulting extract having the consistence of jelly, being, as is necessary, completely devoid of acetic acid, and in every way satisfactory. This was exemplified particularly in a wine of ipecac prepared from the modified extract, which had the pure vinous odor, free from that of acetic acid so commonly observed.—Pharm. Journ., Mar. 19, 1898, 295.

Malt Extract—Effect of Certain Temperature on the Relative Proportions of Maltose and Dextrin.—According to the results obtained by O'Sullivan, the digestive action of diastase on soluble starch is not increased or diminished by varying the temperature between 60° and 70° C., the only difference being in the relative proportions of maltose and dextrin formed. That is to say, the diastase has the same starch-converting power within the limits of these temperatures, and consequently the actual starch converting-power of a malt extract is the same whether tried at 70° or at 60° C. Thus, at 68°–70° the products formed were 17.40 per cent. maltose and 84.60 per cent. dextrin, whilst below 63° C., the percentages were 67.85 per cent. maltose and 32.15 per cent. dextrin. The starch-converting value of the malt extract being the same at both temperatures, it would be wrong to say that the one yielding the larger percentage of maltose is better than the one yielding the larger percentage of dextrin.—Pharm. Jour., Feb. 26, 1898, 183; from Jour. Chem. Soc.

Malt Extract—Practical Process of Preparation.—Fellerer recommends the following as being a practical method for the production of malt extract: 1 kilo of malt is broken up and mixed with 1500 Cc. of water of 50° C. and 10 drops concentrated hydrochloric acid. The mash must be kept for two hours at a temperature of 45° C., after which 3500 Cc. of water at 65° C. is added. After two hours, during which time the temperature must be kept at 60° (not more), it is strained, the liquid filtered through coarse cloth and evaporated *in vacuo*. Malt extract prepared in this way is darker than the usual preparations in the market (which are often clarified by means of albumin), but is sweet and pleasant to the taste. If a lighter color is desired, the temperature should not be allowed to rise above 45° to 50° C.; this has, however, the disadvantage of producing an extract of less sweetness. The hydrochloric acid aids the diastasic action very materially.—Pharm. Ztg., 1897, 897; from Südd. Apoth. Ztg., 1897, No. 88.

Extracts of Meat—Researches on their Composition.—J. Bruylants observes that it has long been admitted that extracts of meat contain, as proteic substances, but a small quantity of gelatin. A large proportion of the nitrogen belongs to other proteic substances, albumoses and peptones; that is to say, to substances whose nutritive value is greater than that of albumides, since they have already undergone some of the modifications due to digestion. The result of the examination of a number of different samples of extract shows that Liebig's extract is the richest in the most nutrient and assimilable substances, though *dry* Bovril is not far below it; liquid Bovril is comparatively poor.—Chem. News., July 16, 1897, 45; from Jour. de Pharm. et Chim. (6) v., No. 11.

EXTRACTA FLUIDA.

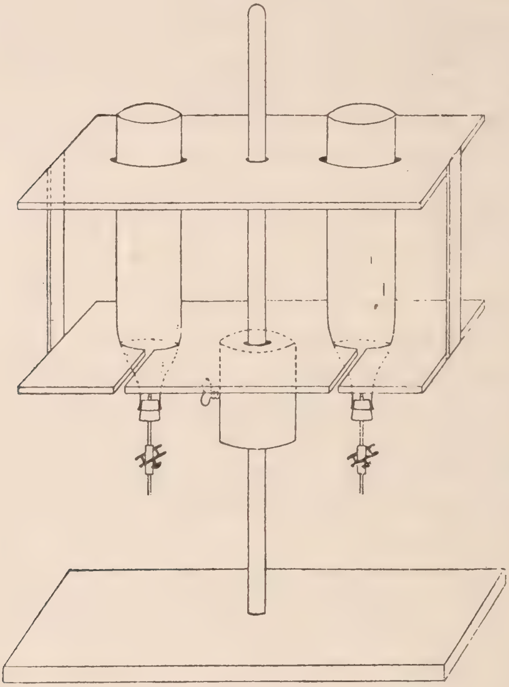
Fluid Extracts—Proposed Standardization on the Basis of their Solid Constituents.—Dr. O. Linde considers it quite feasible to establish standards for fluid extracts, which are based upon the percentage of their solid components. As examples he has selected the fluid extracts of cascara sagrada, condurango, frangula, hydrastis and ergot. He gives the results of the experiments made, which are exhibited in the following table:

Drug.	Composition of Solvent.	Sp. Gr, of Solvent.	Residue of Evaporation of Fluid Extract.	Sp. Gr. of Fluid Extract.
Cort. Cascaræ Sagr.	3 alc. + 7 water.	0.963 to 0.967	26 per cent.	1.064 to 1.068
Cort. Frangulæ........	3 alc. + 7 water.	0.963 to 0.967	20 per cent.	1.042 to 1.046
Rhizoma Hydrastis.....	7 alc. + 3 water.	0.892 to 0.896	20 per cent.	0.964 to 0.968
Secale cornutum.......	2 alc. + 8 water.	0.975 to 0.979	15 per cent.	1.040 to 1.044

On the basis of this result, which has been confirmed as representing extremes of averages in numerous experiments, the author formulates descriptions of the character of the fluid extracts named, which he recommends for adoption in a future revision of the Pharm. Germ.—Pharm. Centralh., Dec. 30, 1897, 881.

Fluid Extracts—Preparation According to a German Idea of Repercolation.—Franz Musset finds that aside from absolutely useless fluid extracts, such as the fluid extracts of senna and rhubarb, there are some that are very useful, provided they are prepared by a process that will secure complete extraction without necessity of evaporating any portion of the extract. This, he finds, can be accomplished by a process of re-percolation, which is briefly described in the following, and which is so simple, that only two percolators are required, arranged as shown in the accompanying drawing (Fig. 61). The capacity of these is from one-half to three-fourths liter, for making from one to two kilogrammes of fluid extract. They are provided at the neck with the usual glass tube passing through a cork, to which a second short glass tube is attached by means of a rubber tube bearing a pinch-cock. It should be observed also that the author is opposed to the use of fine powders, preferring the No. 3 powder of the Pharm. Germ. (passing through two Mm. meshes). To make 1000 grammes of fluid extract, this quantity of drug is divided into ten portions, which are to be treated successively with the same menstruum and percolates as provided. The first portion is moistened with 75 grammes of the menstruum and allowed to stand over night in a covered vessel. In the morning, 150 grammes of the menstruum are poured into one of the percolators, the neck of which is loosely stopped with cotton, and the pinch-cock closed. The moistened and swelled powder is then added, distributed throughout the fluid by the aid of a glass rod, and the stiff magma covered with a disk of filter paper, while the percolator itself is covered with a glass plate and allowed to stand over night once more. Percolation is now commenced by pouring on 75 grammes of menstruum, and continuing to pour on portions of 75 grammes at a time until 8 por-

FIG. 61.



Re-percolator for Fluid Extracts.

tions of percolate, each of 75 grammes, have been collected in bottles of suitable size—these portions constituting a series from No. 1 to No. 8. With these portions of percolate the second portion of drug is treated, precisely as the first portion, using percolate No. 1 to moisten, pouring Nos. 2 and 3 into the prepared percolator, and then beginning the percolation with No. 4, and continuing with Nos. 5, 6, 7, 8, followed by any liquid that may be expressed from the dregs and with sufficient fresh menstruum to make again 8 portions of percolate of 75 grammes each. This procedure is repeated with the third portion of drug; but when the fourth portion of drug is reached, the first portion of 75 grammes of percolate is reserved, and eight portions of percolate are then obtained as before. In like manner the first portion of percolate is reserved from the sixth and eighth portions of the drug respectively, making a total of 225 grammes of reserve, to which the percolate from the tenth and final portion is to be added until a total of about 970 grammes of reserve is obtained. The dregs from the tenth portion are expressed and filtered, added to any final exhaust percolate that may be necessary from that portion, evaporated and added to the 970 grammes of reserve so as to make 1000 grammes of finished fluid extract.—Pharm. Centralh., Dec. 23, 1897, 862.

Repercolation—Comparative Experiments.—With the object of ascertaining whether it is possible to secure the complete exhaustion of drugs in making 50 per cent. tinctures by the process of repercolation, D. Clarke Kelly has made a series of experiments, selecting for this purpose gentian, uva ursi and squill, and treating them as nearly as possible under like conditions. These are given by the author in detail, but it suffices here to say, that 100 grams of the drug, powdered to the fineness of the U. S. P., was divided into four equal portions, treated preliminarily in accordance with the directions and the menstruum of the Pharmacopœia, reserving from the first portion 37 Cc., from the second, 40 Cc., from the third 50 Cc., and from the fourth portion enough to make with the three previous portions 200 Cc. of tincture—the three last portions being obtained by successively using the weaker percolates from the previous portion before adding fresh menstruum. The weak percolate from the first portion amounted to three portions of 75 Cc. each, and this was followed in the second and third portions by 20 Cc. of fresh menstruum to wash out the dregs, and in the fourth portion by a sufficient quantity to obtain the required amount of tincture. The results given in the following table show the total amount of extract in each drug, the amount contained in the 50 per cent. tincture, and the amounts that are retained by the dregs in each of the four portions, together with the amount of additional menstruum required to exhaust the dregs.

DRUG.	Total per cent. of Extract.	Per cent in 50 per cent. Tincture.	Per cent. Extract left in No. I.	Per cent. Extract left in No. II.	Per cent. Extract left in No. III.	Per cent. Extract left in No. IV.	Amount Menstruum to exhaust dregs.
Gentian	44.6	39.68	.18	.324	.848	2.056	325 Cc.
Uva Ursi	33.46	24.08	.378	1.16	3.21	6.3	550 Cc.
Squill	58.06	37.24	1.042	2.746	6.51	9.52	475 Cc.

The results prove that repercolation, while doubtless possessing advantages over simple percolation, does not completely extract drugs under the conditions given.—Proc. Kansas Pharm. Asso., 1897, 40–41.

Percolation—Influence of Temperature.—Guy B. Norris communicates the results of some interesting experiments made with the object to determine what influence temperature may have in the process of extracting the soluble constituents of drugs by percolation. The process used and the quantities employed are similar to those which have been used by others in experimenting with the fifty per cent. tincture, and the experiments having been made as nearly as possible under like conditions, except as to temperature. They prove to be very instructive, and clearly demonstrate the advantage of a higher temperature over a lower in carrying out the process of percolation. The results are shown in the following table, and refer to the extractive contained in a 50 per cent tincture made with the official fluid extract menstruum; the amount of extractive retained by the dregs being also given:

DRUGS.	Per cent. of Extract in 50 per cent. Tincture.	Per cent. of Extract in Dregs.	Per cent. of Total Extract.
Belladonna:			
1. (0° C.)	3.41	16.69	20.10
2. (20° C.)	6.60	13.50	20.10
3. (38° C.)	12.38	7.72	20.10
Gelsemium:			
1. (0° C.)	4.44	23.06	27.50
2. (20° C.)	6.00	21.50	27.50
3. (38° C.)	10.68	16.82	27.50
Valerian:			
1. (0° C.)	11.71	6.41	18.12
2. (20° C.)	14.56	3.56	18.12
3. (38° C.)	16.12	2.00	18.12
Sarsaparilla:			
1. (0° C.)	6.96	5.70	12.66
2. (20° C.)	8.12	4.54	12.66
3. (38° C.)	9.29	3.37	12.66
Senna:			
1. (0° C.)	5.94	7.50	13.44
2. (20° C.)	10.11	3.33	13.44
3. (38° C.)	11.36	2.08	13.44

A second series of experiments was also made with the same drugs, using alcohol as the menstruum in each case, and omitting the percolation at 0° C. The results are given as follows:

Belladonna:	
1. (20° C.)	3.06 per cent.
2. (38° C.)	4.25 “
Gelseminum:	
1. (20° C.)	6.00 “
2. (38° C.)	10.68 “
Valerian:	
1. (20° C.)	6.38 “
2. (38° C.)	10.96 “
Sarsaparilla:	
1. (20° C.)	1.56 “
2. (38° C.)	2.13 “
Senna:	
1. (20° C.)	2.98 “
2. (38° C.)	6.00 “

The experiments throughout were carried out with an eye to the directions of the U. S. P., and with as much care as possible.—Proc. Kansas Pharm. Assoc., 1897, 41–44.

Fifty Percent Tinctures—A Problem of Drug Extraction by Percolation.—In continuation of previous papers (see Proceedings 1897, 418–421), Prof. L. E. Sayre communicates a third paper in which he discusses the results obtained by his assistants in the following different phases of drug extraction: 1, in repercolation; 2, in the percolation and repercolation of taraxacum; 3, on the influence of temperature on percolation; and 4, experiments in incomplete percolation. The results of these several experiments, as summarized by the author, are briefly as follows:

Repercolation, while it has advantages over simple percolation, is yet insufficient to totally exhaust the drug in making fifty per cent. tinctures in the quantities of the experiment (100 grammes of drug). In the case of

Percolation and Repercolation of Taraxacum, in which from 320 Gm. of powdered taraxacum 631 Cc. of percolate was obtained by both processes, the results speak for the greater efficiency of repercolation, though by this the required limit for a fifty per cent. tincture was scarcely reached. By simple percolation, however, exhaustion was not accomplished by 200 per cent. of percolate. Finally, a series of experiments were made, by what the author calls

Incomplete Percolation, but which he says is perhaps better described by the phrase: “Percolation with incomplete exhaustion.” In this 1000 grammes of the drug are percolated with menstruum until 750 Cc. of percolate are obtained. This is the complete process, and the residue containing the absorbed menstruum is sacrificed. The process is based on the assumption that the first seventy-five per cent. of percolate received contains at least seventy-five per cent. of the soluble and desirable principles of the drug. The figures obtained, while disappointing, are not wholly so. The author believes that if the process were applied to making fifty per cent. tinctures it might, with quantities of 1000 grammes of drug, prove successful. But to establish this beyond dispute, further experiments must be made.—Drug. Circ., Aug., 1897, 212.

Fifty Per Cent. Tinctures—Question of Expediency for their Introduction.—Referring to the proposition of the American Pharmaceutical Association Committee of Revision to induce a new class of preparations, 50 per cent. tinctures, into the Pharmacopœia, under a distinctive title, such to take the place of tinctures and fluid extracts whenever both are officially prepared from the same drug, S. W. Williams expresses himself in opposition to such action by the revisers of the U. S. P. The continual improvement and multiplication of pharmaceutical assay processes and successful efforts in devising physiological tests, either supplementing or replacing them, are rapidly broadening the scope of practical standardization. When uniformity is considered in reference to individual preparations, its great importance and desirability cannot be questioned. But when it is contemplated to alter a long-established class of preparations with the view of bringing about a definite mathematical relationship between the different members of the class, practical difficulties present themselves which wholly or in part may neutralize any advantage to be gained. The author points out various directions in which improvements can be made, such as standardizing all preparations from drugs capable of standardization, the adoption as standards of the average strengths of our present tinctures, etc.; but he questions whether essential uniformity demands changes in the proportion of crude drug to menstruum, any further than is necessary to meet standards based on the average strength of preparations now in use.—Drugg. Circ., Aug. 1897, 214.

Extractum Belladonnæ Liquidum—Modification of the Assay Process of the B. P., 1898.—Harold Wilson, after describing the assay process of the new British Pharmacopœia for the standardization of liquid extract of belladonna, communicates the results of some experiments made in order to determine some questions concerning its reliability, which had occurred to him. As the result of his investigation he suggests the following modification of the official process:

Mix 10 Cc. of the strong percolate with 10 Cc. of water, and very slightly acidify with sulphuric acid; evaporate in a porcelain dish to the consistence of a thin syrup. Add 20 Cc. of water and filter through a plug of cotton wool into a separator, washing the dish, and filter with 30 Cc. of water. Add now 10 Cc. of a mixture of ether and chloroform (equal volumes) and excess of ammonia; agitate, separate the ether-chloroform solution; twice repeat the operation and separate as before. Shake the mixed ether-chloroform solution with 5 Cc. dilute sulphuric acid, mixed with twice its volume of warm water, separate and repeat the operation. Wash the mixed acid solutions with 3 Cc. of ether-chloroform; then agitate with 10 Cc. of ether-chloroform and excess of solution of ammonia. Separate the ether-chloroform solution, and twice repeat the agitation and separation as before. Place these solutions in a tared dish, evaporate on a water-bath, dry below 100° C., and weigh. Dissolve this residue in 10 Cc. of decinormal solution of hydrochloric acid and add centinormal solution of sodium hydroxide until the solution is neutral, using tincture of cochineal as indicator. Deduct the measure of soda solution required from 100 Cc., and multiply the remainder by .00287. The product will be the weight in grammes of alkaloids present in 10 Cc. of the liquid extract. This figure should not differ by more than .01 gramme from that obtained by titration. From the quantity of alkaloid found by titrating calculate the amount present in the bulk of strong percolate, and add to the latter sufficient of the alcoholic menstruum to make it contain 0.75 gramme of alkaloid in 100 Cc.—Pharm. Journ., May 14, 1898, 450.

Fluid Extract of Licorice—Comparison of B. P. and U. S. P. Methods of Preparation.—The B. P. process for the preparation of liquid extract of licorice having been compared unfavorably with the U. S. P. process, Peter Boa has made a series of experiments which appear to demonstrate the contrary. In the British process, the drug in No. 20 powder is twice macerated in cold water, the resultant infusions are heated to boiling point in order to coagulate albumen, strained, evaporated so that the residual liquid, when cold, shall have a sp. gr. of 1.160, adding one-sixth of its volume of alcohol to the concentrated liquid, and then straining. Under these directions, the amount of final product must of necessity vary, according to the amount of soluble substance extracted, and, again, according to the amount of precipitate produced by the alcohol. The product, however, possesses all essential qualities that are derived from licorice root. It has a sweet mellow taste, free from acridity and with only a faint bitterness, whereas the U. S. P. preparation, which is made by percolation with diluted alcohol containing three per cent. of water of ammonia, was found to have an acrid bitter taste, which quite overpowered the sweetness. This observation is significant in its bearings upon the statement made by Remington, in 1878 (see Proceedings, 1878), that the addition of ammonia very perceptibly diminished the acridity of a fluid extract of licorice made with an alcoholic menstruum, and increased the quantity of glycyrrhizin. Mr. Boa, however, calls attention to the fact, that the increase of glycyrrhizin and decrease of acridity in Remington's experiments are coincident with the increase of water in the menstruum employed. He now records experiments which clearly show that there is no advantage in using ammonia for the extraction of licorice root, but rather a disadvantage, since licorice root that has been so completely extracted with water by percolation that the percolate will pass both colorless and tasteless, will furnish an additional percolate with dilute ammonia having a very dark color but no sweetness. He does not, however, wholly discard the use of ammonia, but considers it an advantageous addition to the percolate with the object of preventing its decomposition (souring) while awaiting further treatment. The fluid extract, also, might be profitably treated with sufficient ammonia water to overcome the slight acidity which, as now prepared (by the B. P. process) it always has. His conclusions are that water is the best menstruum for extracting the sweetness of licorice. If percolation of a coarser powder were substituted for double maceration and expression of the root in No. 20 powder, it would make the process less messy. Ammonia might be judiciously employed in the way indicated by him to prevent loss of sweetness, and a slight increase in the alcohol would make sure work of preservation, and produce a cleaner extract.—Pharm. Journ., Feb. 26, 1898, 188–189.

Fluid Extract of Ipecacuanha—Examination of an Old Sample.—Charles H. La Wall has had opportunity to examine an authentic and original bottle of fluid extract of ipecacuanha bearing a label stating that it was prepared at the U. S. A. Laboratory, Philadelphia, 1864. The bottle had been so carefully sealed that no apparent evaporation of the liquid had taken place; it had a pleasant acetic odor—due to the acetic acid directed in the Pharmacy of 1860*—and a strong, characteristic taste, and assayed, when decanted clear, 2.76 per cent. of alkaloid, calculated as emetine. As 2 per cent. is the present standard adopted by manufacturers who assay this preparation, it has lost little or no alkaloid after a period of thirty-three years. The author considers that this speaks well for the quality of the drug, the thoroughness of the manipulation used, and for the method of preparation, all of which was under the supervision of the late Prof. John M. Maisch.—Amer. Jour. Pharm., Dec., 1897, 619–620.

Fluid Extract of Golden Seal—Method of Assay.—Dr. A. B. Lyons proposes the following practical method for the valuation of fluid extract of golden seal. Put into a one ounce prescription vial, having a square shoulder and a good lip, 2 Cc. of the fluid extract, with 15 Cc. of ether, shake, add a few drops of water of ammonia and immediately shake again, rather vigorously, about 30 seconds. Allow the ether to separate completely, then decant this into a second vial; add 15 Cc. of fresh ether to Vial No. 1, shake and set by. Into Vial No. 2, put 2 Cc. of dilute hydrochloric acid (3 per cent.), shake well together. Decant the ether, when separated, into a third vial containing 5 Cc. of water acidulated with hydrochloric acid. Shake the vial, and set by to separate. Now decant the ether from Vial No. 1 into No. 2, add a third portion of fresh ether to No. 1 and shake. Pour off the ether from No. 3 into a two-ounce vial, and carry the other two portions of ether successively through the three vials, just as in the first instance, receiving all finally into the two-ounce vial. Now pour the contents of No. 3 into No. 2, which will contain all the hydrastine ; add 15 Cc. of ether and an excess of water of ammonia (perhaps ten drops). Shake until the mixture clears up, from solution of the precipitated alkaloid in the ether ; when separated, decant the ether into No. 3, add 5 Cc. of distilled water and one one drop of water of ammonia. Shake together, and allow to separate. When the separation is quite complete, decant the ether into a tared beaker (75 or 100 Cc.) Repeat the treatment of the contents of Vials No. 2 and No. 3, with two successive portions of fresh ether. Evaporate the ether in the tared beaker by a gentle heat, dry at 100° C. to constant weight, and weigh the residue as hydrastine. It will be of a deep yellow color, and yet it consists almost wholly of the white alkaloid. If it be required to obtain the hydrastine in a condition of greater purity, a somewhat larger quantity of the fluid extract should be used. The residue of crude hydrastine from 5 Cc. of fluid extract is dissolved in 5 Cc. of warm alcohol, 2½ Cc. of ether added, then 12 Cc. of water, and the mixture set by 24 hours in a cool place. The hydrastine may then be collected on a pair of mutually counterpoised filters, washed with a little water, dried at 100° C., and weighed. The loss, however, of hydrastine must be very considerable.

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* According to this process the drug was extracted with alcohol, the tincture evaporated to a syrupy liquid, the product from 16 ounces mixed with 1 fluid ounce of acetic acid and 10 fluid ounces of water, boiled gently until reduced to 8 fluid ounces, filtered to remove resin, the filtrate made up to 8 fluid ounces, and this mixed with 8 fluid ounces of alcohol. The process was that originally suggested by Prof. Wm. Procter, Jr.—Rep.

The berberine of the fluid extract remains in the residues from which hydrastine has been extracted—nearly all of it in Vial No. 1. The small quantity held in solution by the ether collected in the two-ounce vial may be neglected. Unite the residues from the three one-ounce bottles in a porcelain capsule, rinse the vials with a little water, adding this to the contents of the capsule, which may be made up to a measure of 25 Cc. Render this acid with dilute hydrochloric acid, and warm it to expel traces of ether. If not clear, filter, washing the filter with a little water which is to be added to the filtrate. Add an excess of Mayer's reagent 2½ Cc., if of the ordinary strength ($HgCl_2$ 6.775 Gm. to the liter). Collect the precipitate, after ten minutes, on a pair of mutually counterpoised filters, wash with a little water, dry at 100° C., and weigh. The weight divided by two will be the weight of the berberine contained in the 2 Cc. of fluid extract.—Pharm. Era, April 7, 1898, 499.

Aromatic Fluid Extract of Senna (Fluid Senna)—Approved Formula.—The "Cincinnati Academy of Pharmacy" published the following formula for "fluid senna." The preparation, while of the strength of the ordinary fluid extract, contains very little alcohol. Take of Senna, 1000 grammes ; sugar, 500 grammes ; oil of coriander, 0.75 Cc ; diluted alcohol, a sufficient quantity to make 1000 Cc. Percolate the senna as in formula 174* National Formulary. Then take out and dry the senna, and prepare a fluid extract by process *A* (National Formulary) and diluted alcohol. Disolve 350 grammes of sugar in the reserve percolate by heat over a water bath and evaporate to about 700 Cc. Dissolve the remainder of the sugar in the exhaust percolate and evaporate on a waterbath until this, when mixed with the reserved portion and strained, will measure 1000 Cc. Lastly add the oil of coriander and mix thoroughly. Amer. Drugg. Mar. 10, 1898, 129.

Liquid Extract of Taraxacum—Commercial Quality.—A. J. Dey has examined seven commercial samples of liquid extracts of taraxacum and compared them with a standard sample, prepared by him from dandelion root of good quality in strict conformity with the B. P. directions. This sample is designated as A in the following table exhibiting his results:

No.	Sp. Gr.	Alcohol, per cent. by vol.	Extractive from 1 fl. oz. in grains.	Copper.
A	1.064	27.95	91.	Absent
1	1.002	35.35	47.5	Distinct
2	0.992	30.65	29.3	"
3	1.094	27.04	100.5	"
4	1.088	23.19	121.8	Abundant
5	1.010	19.37	25.	Distinct
6	1.046	40.84	110.8	Trace
7	1.064	30.65	73.	"

In taste No. 4 was most bitter, the standard sample coming next. All the rest were much alike, except No. 1., which tasted strongly alcoholic. As will be noted, copper was found in all the commercial samples, which, moreover, showed a great want of uniformity.—Pharm. Journ., Feb. 19, 1898, 179.

Fluid Extract of Senecio Jacobæa—Process of Preparation.—William Kirkly prepares a fluid extract of ragwort (*Senecio Jacobæa*) by exhausting the herb, reduced to No. 20 powder, with proof spirit by a process of repercōlation. Three pounds being taken in operation, one pound is moistened with 14 ozs. of the spirit, packed into the percolator after 12 hours, 14 ozs. of spirit are poured on, and percolation is allowed to proceed after 24 hours more. With the percolate obtained a second pound is treated in the same manner, and with the percolate from this, a third pound is percolated in the same way until 48 fluid ounces are obtained. This constitutes the fluid extract. It has a sp. gr. at 15.5° C. of .985, yields 13 per cent. of residue when dried at 100° C., and keeps well—a sample nine months old showing only a slight deposit.

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* This requires the use of strong alcohol, which is not mentioned in the present formula.—Rep.

Concentrated Essence of Coffee—New Formula.—Bardet recommends the following process for making a concentrated coffee essence: Put a pound of freshly-ground coffee into a large funnel and pour upon it three liters of boiling water. Collect the percolate and set aside; then pass more boiling water through the marc until a total percolate of five liters is obtained. Evaporate this second percolate to half a liter, add the reserved portion, leave the mixed liquors in the water-bath for twenty minutes, and add to this extract 10 per cent. of glycerin.—Pharm. Journ., Nov. 27, 1897, 462; from Bull. Gér. de Thérap., cxxxiii., 122.

INJECTIONES.

Injections—Various Formulas.—The following "injections" are used in the hospitals of the city of New York, and are prepared according to formulas edited by Dr. Chas. Rice:

Glyceritum Fellis Bovis: Fel bovis inspiss., 100 Gm.; glycerin, 70 Gm.; acid. salicylicum, 1 Gm.; aqua, q. s. ad 200 Cc. Used chiefly for rectal injections, in quantities of one-half to two fluid ounces, mixed with soap suds.

Injectio Acidi Borici et Zinci: Acid. boricum, 8 Gm.; zinci sulphas, 1 Gm.; alcohol, 15 Cc.; aqua, q. s. ad 240 Cc. Urethral injection.

Injectio Adstringens (Lloyd's Injection): Zinci acetas, 0.5 Gm.; plumbi acetas, 0.5 Gm.; glyceritum hydrastis, 50 Cc.; aqua, q. s. ad 150 Cc. Urethral injection.

Injectio Plumbi et Zinci cum Opio: Plumbi acetas, 0.5 Gm.; zinci sulphas, 0.5 Gm.; tinct. opii, 7.5 Cc.; aqua, q. s. ad 115 Cc. Urethral injection.

Lotio Rubra (Red Wash): Zinci sulphas, 0.5 Gm.; tinct. lavandulæ co., 6 Cc.; aqua, q. s. ad 90 Cc. Urethral injection.—Amer. Drugg., April 11, 1898, 189–190.

LINIMENTA.

Liniment—A Good Formula.—Wm. Weber recommends the following formula for preparing a "first-class" liniment: Tincture of aconite, tincture of capsicum, ammonia water, of each 5 ozs.; spirit of camphor, 15 ozs. In giving directions it should be recommended that it be applied by friction with a cloth.—Amer. Drugg., Dec. 25, 1897, 366.

Liniments, Embrocations and Lotions.—The following formulas are for preparations used in the hospitals of New York City, and edited by Dr. Chas. Rice:

Embrocatio Tiglii Iodata (Carson's Paint).—Oleum tiglii, 1 vol.; ether, 2 vols.; tinct. iodi co., 5 vols. For external use.

Linimentum Aconiti et Chloroformi Compositum ("G. D. D. Liniment"). —Tinc. aconiti, 4 vols; chloroform, 4 vols.; spir. camphoræ, 4 vols.; oleum thymi, 1 vol.; lin. saponis, 64 vols. For external use.

Linimentum Anodynum (Mott's Liniment).—Chloroform, tinct. aconiti, tinct. iodi, aqua ammon., of each 10 Cc.; Linim. saponis, q. s. ad., 80 Cc., Add the chloroform and tincture of aconite to the soap liniment; then the tincture of iodine, and lastly the ammonia water. For external use.

Lotio Acidi Borici et Tannici.—Acid. boricum, 4 Gm.; glycerit. acidi tannici, 15 Cc.; ol. gaultheriæ, 10 drops; aqua, q. s. ad., 120 Cc. To be used as a nasal douche.

Lotio Alba (*White Wash*).—Zinci oxidum 10 Gm.; liquor plumbi subacet., 15 Cc.; glycerin, 20 Cc.; liq. calcis, q. s. ad. 150 Cc. For external use.

Lotio pro Alopecia (*Dandruff Wash*).—Hydrarg. chlor. corros., 1 Gm.; resorcin, 25 Gm.; acid. boricum, 25 Gm.; glycerin, 20 Cc.; alcohol, 150 Cc.; aqua, q. s. ad. 300 Cc. To be used as a wash for the scalp.

Lotio Vesicalis (*Bladder Wash*).—Sodii boras, 65 Gm.; spir. gaulth., 30 Cc.; glycerin, 250 Cc.; aqua, q. s. ad. 500 Cc. For bladder irrigation.—Amer. Drugg., April 11 and 25, 1898, 189 and 221.

Eye Lotions—Formulas.—Dr. A. R. L. Dohme suggests the following formulas for eye applications for criticism to the Maryland Pharmaceutical Association, particularly as to their preservation:

1. Sodium borate, 10 grains; camphor water, 1 drachm; water, sufficient to make 1 ounce.

2. Boric acid, 10 grains; camphor water, 1 drachm; water, sufficient to make 1 ounce.—Proc. Maryland Pharm. Assoc., 1897, 41.

Hartshorn Liniment—Improved Formula.—The "Cincinnati Academy of Pharmacy" publishes the following formula for ammonia liniment under the special designation,

Liquid Oleate of Ammonia: Ammonia water, 100 Gm.; lard oil, 90 Gm.; cotton-seed oil, 110 Gm. Mix by agitation in a bottle. This liniment is of the same ammonia strength as liniment of ammonia, U. S. P., and contains about 57 per cent. of ammonium oleate, which is perfectly saponified.—Amer. Drug., March 10, 1897, 130.

Turpentine and Soap Liniment—Formula.—Schnabel recommends the following formula for making a turpentine liniment with soft soap, which will preserve its uniform consistence for several months: Potassium carbonate, 5 Gm.; soft soap, 40 Gm.; oil of turpentine, 55 Gm. The liniment will not bear dilution with water or alcohol.—Pharm. Centralh., xxxviii., 364.

Eucalyptus Opodeldoc—Formula.—The "Südd. Apoth. Ztg.," gives the following formula for eucalyptus opodeldoc: Dissolve 90 parts of soap in 750 parts of alcohol, and add 45 parts of camphor, 7.5 parts of menthol, 22.5 parts of oil of eucalyptus, and 45 parts of ammonia water.—Pharm. Era, March 17, 1898, 399.

Liniment of Stillingia—Formula.—The "Cincinnati Academy of Pharmacy" publishes the following formula for "stillingia liniment." Oil of stillingia, 26.5 Cc.; oil of lobelia, 7 Cc.; oil of cajuput, 13.5 Cc.; alcohol, a sufficient quantity to make 100 Cc.—Amer. Drugg., Mar. 10, 1898, 129.

Iodized Oils—Preparation.—A. Schmitt finds that by combining iodine and sodium iodide with a small amount of glycerin, a solution is obtained which is readily taken up by oils so as to form stable and elegant preparations. It is thus possible to prepare an iodized oil quickly without the application of heat, which in the case of cod-liver oil is a great advantage. The proportions used are sublimed iodine 1 gramme, sodium iodide 25 centigrammes, glycerin 1 to 2 drops. Rub together until dissolved, then add the prescribed amount of cod-liver or other oil.—Pharm. Journ., May 28, 1898, 505; from Union Pharm.

Mange Lotion for Dogs—Formulas.—Edward Swallow recommends the following lotions for mange in dogs: 1, Boric acid, 30 grains; glycerin, 2 drachms; water, to 4 fluid ounces. 2, Zinc oxide, 2 drachms; precipitated sulphur, 1 drachm; glycerin, 2 drachms; rose water, 4 fluid ounces. To be applied after thoroughly washing the animal with soft soap and after plentiful rinsing with water, allowing the parts to become nearly dry.—Amer. Drugg., April 11, 1898, 187.

LIQUORES.

Solutions of the U. S. P.—Criticisms and Suggestions.—F. E. Haskins has endeavored to determine the characters and the conditions of change that some of the official solutions undergo on keeping. With regard to

Liquor Plumbi Subacetatis he observes that, following the U. S. P. directions carefully and using the quantities stated, it is impossible, either theoretically or practically, to obtain a solution containing 25 per cent. of basic lead acetate. By employing 10 grammes more of lead acetate than the official formula demands, a solution containing 25 per cent. of basic salt may be obtained.

Liquor Sodæ Chloratæ, when made by the directions and under the conditions of the U. S. P., is easily obtained of the official strength, viz., 2.6 per cent. of available chlorine. The chief difficulty is to find a chlorinated lime of the required strength. As is well known, the solution loses strength on keeping, and care should therefore be observed to keep it well closed and carefully protected from light. Stronger solutions, up to 7 per cent. available chlorine, were not found to keep any better.

Liquor Ferri et Ammonii Acetatis.—While the preparation now official possesses considerable stability, doubtless due to the replacement of the syrup in the older formula by glycerin, it deposits a basic iron acetate after a time. He has examined such a precipitate amounting to 0.613 Gm. when thoroughly washed and dried at 100° C. He determined it to be composed of 0.270 Gm. of acetic acid, and 0.245 of iron, the rest, 0.98 Gm., being in all probability hydroxyl (OH).

Liquor Potasii Arsenitis and *Liquor Iodi Compositus* are quite stable preparations, though each deposits a precipitate on long standing. In the case of the arsenical solution, the precipitate is due to the red saunders and excess of alkali. The percentage of arsenic remains the same.—Merck's Report, Feb. 1, 1898, 72.

Liquor Plumbi Subacetatis—Improvement of Formula, Correction of Specific Gravity, etc.—Frederick W. Haussmann criticises the U. S. P. and other official processes for the preparation of liquor plumbi subacetatis. He favors the process of maceration in preference to that of boiling, but finds that the maceration process can be very much shortened by using boiling water instead of cold water. His directions are as follows: Into a strong bottle—a fruit-juice bottle will answer—pour boiling distilled water to a previously affixed mark indicating 730 Cc. Then quickly add 170 Gm. of selected *crystallized* lead acetate, previously broken into small pieces, cork the bottle, and dissolve by agitation. Now add 100 Gm. of lead oxide, previously sifted, in divided portions, shaking after each addition. The litharge will have changed to white within from five to ten minutes, but the mixture is allowed to stand until cold, and then filtered under the usual precautions. The product fulfils the requirements of the U. S. P. in all particulars. Experiments are recorded by the author which show the official sp. gr. to be given incorrectly. The pharmacopœial figure is 1.195. It should be 1.225. Concerning samples of

Commercial Goulard's Extract, the author observes that all that were examined had precipitates, varying in intensity, as might be expected from the extreme liability of the formation of lead carbonate, which takes place even when every precaution is employed to prevent the access of air. As a necessary consequence, decrease, both in specific gravity and volumetric strength, will result. The

Liquor Plumbi Subacetatis dilutus of the shops presented even greater variation in strength than Goulard's extract. This is not alone due to the same liability to change, but also to the fact that many pharmacists fail to use distilled water for the dilution of the Goulard's extract. Many, in fact, prefer to dispense a cloudy solution, to lessen the liability of error in connection with lime water. The author, therefore, calls attention to the direction of the French Codex, to add a small quantity of vulnerary spirit (an alcoholic solution of the oils of lavender, sage and rosemary) with the view to easily distinguish lead water from lime water. Finally he calls attention to

Dried Lead Subacetate, which has recently been proposed by Dieterich, in his Manual, for the extemporaneous preparation of both Goulard's extract and the lead water—a preparation which may readily be made and adjusted to the pharmacopœial requirements by the practical pharmacist. —Amer. Jour. Phar., Nov., 1897, 559–568.

Liquor Plumbi Subacetatis—Pharmocopœial Requirements.—C. T. P. Fennel, drawing his conclusions upon the official description and characters of the lead acetate and lead oxide, observes that in executing the pharmacopœial process, a solution of basic lead acetate containing 25 per cent. cannot be produced. The pharmacopœial physical characters, so far as color, odor and taste are concerned, are easily complied with, but the sp. gr. 1.195 at 15° is too low for the strength claimed. The sp. gr. varies slightly between 1.23 and 1.25 at 15° for an approximately 25 per cent. strength of lead subacetate. The pharmacopœial test, which states that 13.67 grammes of the solution requires 25 Cc. of normal sulphuric acid for complete precipitation, is, on the ground of the deficient strength of the officialy prepared solution, incorrect. This amount of normal acid will completely precipitate 14.82 grammes of the solution. This test should also be modified to the extent of diluting the necessary quantity of solution of lead subacetate with 1 part of water and 3 parts of alcohol, using normal sulphuric acid without the use of an indicator.—Amer. Drugg., Aug. 10, 1897, 65.

Fowler's Solution—Value as a Lotion for Lupus.—Schutz has found a lotion composed of 4 Gm. of Fowler's solution, 20 to 30 Gm. of water and 2 minims of chloroform to give good results in the treatment of lupus erythematosus. The lotion is applied to the affected part night and morning by means of a camel-hair pencil, this treatment being usually intercepted on the fifth day and resumed again on the fourth or fifth day when increase of swelling and redness caused by the treatment has again subsided. A cure may thus be effected in the course of ten or eleven weeks without leaving a scar.—Pharm. Journ., Sept. 25, 1897, 294; from Brit. Journ., Derm. Sol. ix, 289, after Arch. f. Derm. u. Syph.

Solution of Ferric Chloride—Method of Examination.—E. Falieres observes that the official (Codex) solution of ferric chloride should contain 26 per cent. anhydrous ferric chloride, or 8.96 per cent. of iron; its density is then 1.26. It may, however, be adulterated and its density then brought up to the right point by the addition of salts of soda or potash. The author has sought for a rapid method of estimating its purity, and found that this could be best done by alkalimetric titration of the quantity of acid in combination with the iron, and the estimation of the chlorine by silver nitrate.—Chem. News, Sept. 17, 1897, 146; from Bull. Soc. de Pharm. de Bordeaux, July, 1897.

Solution of Magnesium Citrate—Quick Method of Preparation.—A. H. Benhard recommends the following method for the preparation of solution of magnesium citrate, which takes but 5 minutes as against at least 20 minutes when the directions of the U. S. P. are followed: Heat 6 ounces of distilled water to boiling and add 460 grains of powdered citric acid, which will dissolve quickly; when dissolved add 230 grains of powdered magnesium carbonate, and in less than thirty seconds the reaction is over and the solution clear. Then add 2 ounces of syrup of citric acid, and distilled water enough to make 12 ounces. Pass through a flannel cloth into 12-ounce bottle, add 40 grains potassium bicarbonate, and cork. This solution when made up to twelve ounces with distilled water has sufficiently cooled so as not to expand the glass and fracture the bottle, its temperature being about 75° to 80° F.—Bull. Pharm., July, 1897, 319; from New Eng. Drugg.

Solution of Sodium Phosphate—Improved Formula.—Joseph W. England calls attention to the excessive proportion of citric acid used to anhydrous sodium phosphate in the solution of sodium citro-phosphate originated by William C. Wescott (see Proceedings, 1896) and now commonly prescribed. The introduction of sodium nitrate also may be contraindicated, therapeutically, when the use of sodium phosphate is indicated. He therefore calls attention to the following formula which he has employed for more than a year past in the Philadelphia Hospital, and which he thinks overcomes the objections mentioned, if such exist: Sodium phosphate, dried and powdered (nearly anhydrous), 3 ozs, 96 grs. Troy; phosphoric acid (50 per cent.), 921 grains; water, sufficient to make 8 fluid ounces. Dissolve the sodium phosphate in sufficient water previously mixed with the acid, and filter through paper.—Amer. Journ. Pharm., June, 1898, 303–306; from Philada. Polyclinic, May, 1898.

Liquor Strychninæ Hydrochloridi, Br. P. 1898—Variation in Strength from the B. P. 1885 Preparation.—George Lunan calls attention to the fact that the solution of strychnine hydrochloride of the B. P., 1898, is considerably weaker than the corresponding preparation of the B. P., 1885. It is true that the new edition of the "Extra Pharmacopœia" states that it is one-tenth weaker, but Mr. Lunan produces figures which show that in reality it is only of four-fifths the strength of the older preparation, a fact which the dispensing pharmacist should bring to the notice of practitioners of medicine.—Pharm. Jour., June 25, 1898, 587.

Liquor Bismuthi et Ammonii Citratis—Examination of Commercial Samples.—W. G. Stratton reports the results of analyses of eleven samples of "Liquor Bismuthi," which show that this preparation, as it occurs in the British Pharmacopœia, is very variable in its composition. As will be seen from the following table, some of the makers of this preparation improve on the B. P. process, by adding an excess of ammonium citrate.

No.	Sp. Gr.	Per cent. Bi.	Per cent. NH_3.	Per cent. $C_6H_5O_7$.	Impurities.
Theoretical	1.07	4.375	....	3.956	
1	1.070	4.377	1.048	3.910	Nitrates.
2	1.063	4.167	.927	3.427	
3	1.135	4.476	3.535	14.209	Nitrates.
4	1.070	4.748	.746	3.647	
5	1.073	4.585	.807	4.109	
6	1.073	5.548	.871	3.817	
7	1.072	4.285	.991	4.232	Nitrates.
8	1.150	5.552	3.777	14.736	"
9	1.070	2.968	2.034	6.182	"
10	1.122	5.164	3.200	11.426	"
11	1.029	1.944	.686	2.663	

Owing to the presence of considerable traces of nitrate in samples No. 3, 8 and 10, the figures for the citric radical represent a somewhat larger amount than was actually present.—Trans. Br. Pharm. Conf. (Yearbook of Pharmacy), 1897, 428–429.

Liquor Epispasticus, B. P.—Preparation with Cantharidin.—Greenish and Wilson, in conformity with their investigations concerning *cantharides*—which see under "Materia Medica"—propose that the official blistering liquid be prepared by the following formula: Cantharidin, 1 part; castor oil, 6 parts; resin, 3 parts; acetic ether, enough to make 300 fluid parts. The castor oil and resin are added to replace the natural fat of the cantharides, and are necessary to aid the absorption of the cantharides by the skin.—Pharm. Jour., March 12, 1898, 259.

Solutions—Various Desirable Formulas.—The "Cincinnati Academy of Pharmacy" publishes the following formulas for solutions which are frequently prescribed, and for which no authoritative formula has heretofore been published:

Antiseptic Solution.—Boric acid, 13 grammes; sodium bicarbonate, 8.5 grammes; benzoic acid, 17 grammes; thymol, 3 grammes; menthol, 2 grammes; oil of gaultheria, 1.34 grammes; oil of eucalyptus, 0.6 gramme; tincture of baptisia, 9 Cc.; alcohol, 400 Cc.; distilled water, a sufficient quantity to make 100° Cc. Dissolve the boric acid and the sodium bicarbonate in 300 Cc. of water. Dissolve the remaining ingredients in the alcohol. Add the first solution to the second, and then sufficient distilled water to make 1000 Cc. of solution, which filter, if necessary. An excellent antiseptic.

Solution of Iodide of Gold and Arsenic.—Arsenous acid, 2.8 grammes; iodine 7 grammes; gold triiodide, 3.25 grammes; distilled water, a sufficient quantity to make 1000 Cc. Dissolve the arsenous acid and iodine in a flask in about 500 Cc. of distilled water with the aid of heat, being careful to avoid the loss of iodine. Dissolve the gold triiodide in this solution; transfer to a porcelain capsule and heat over a water-bath until the free iodine is dissipated; then cool, and add enough water to make 1000 Cc. Ten minims contain $\frac{1}{32}$ grain of gold triiodide and $\frac{1}{32}$ grain of arsenous pentoxide—equal to $\frac{1}{8}$ grain of arsenic triiodide.

Solution of Albuminate of Iron.—Ferric chloride, 10 grammes; fresh egg albumen, 375 Cc.; glycerin, 250 Cc.; distilled water, a sufficient quantity to make 1000 Cc. Dissolve the ferric chloride in 125 Cc. of water. Mix the egg albumen with 250 Cc. of water, add the solution of iron and allow the mixture to stand twelve hours. Then add the glycerin, mix, filter and pass sufficient water through the filter to make 1000 Cc. Keep in well-filled bottles in a cool place. A clear, almost neutral solution, containing in each fluid ounce 4¾ grains of ferric chloride—the equivalent of about 40 drops of the tincture.

Solution of Peptonate of Iron: Iron peptonate, 150 Gm.; glycerin, 50 Cc.; spirit of cinnamon, 20 Cc.; aromatic spirit (N. F.), 50 Cc.; distilled water, a sufficient quantity to make 1000 Cc. Triturate the iron peptonate with the glycerin gradually added. Then add 650 Cc. of water, the aromatic spirit and sufficient water to make 1000 Cc. Filter. This solution represents about one-half a per cent. of iron and contains about nine grains of iron peptonate in a teaspoonful.

Solution of Peptonate of Iron and Manganese: Manganese peptonate, 100 Gm.; iron peptonate, 150 Gm.; glycerin, 50 Cc.; spirit of cinnamon, 20 Cc.; aromatic spirit (N. F.), 50 Cc.; distilled water sufficient to make 1000 Cc. Dissolve the peptonates in the glycerin and 650 Cc. of water, add the spirits, mix, and add sufficient water to make 1000 Cc. Each fluid drachm contains about six grains of manganese peptonate and nine grains of iron peptonate.

Liquefied Sodium Phosphate: Sodium phosphate, 100 Gm.; citric acid, 23.4 Gm. Triturate together and heat on a water bath until liquefied. Strain through a pellet of cotton if necessary. This preparation will crystallize at 15° C. (59° F.), but will readily liquefy again upon warming. It is miscible with water or syrup in all proportions without separation. Each fluid drachm represents about 75 grains of sodium phosphate.—Amer. Drug., March 10, 1898, 129–130.

Solution of Ferric Peptonate—Semi-Official Formulas.—The following formulas are given in the "New Supplement" (1897) to the third edition of the German Pharmacopœia:

Liquor Ferri Peptonati.—Dissolve 8 Gm. of dry peptone in 100 Gm. of hot water, cool, and add 174 Gm. of liquor ferri oxychlorati (containing about 3.5 per cent. of iron), neutralize exactly with a 10 per cent. solution of caustic soda, collect and wash the precipitate, mix it with 200 Gm. of simple syrup, warm and add sufficient solution of caustic soda to dissolve it. Cool and add 100 Gm. of alcohol, 3 Gm. of tincture of orange, 1½ of aromatic tincture, 1½ of tincture of vanilla, 5 drops of acetic ether, and water to make 1000 Gm.

Liquor Ferri Peptonati cum Mangano is made in a similar way, but before the addition of the alcohol to solution of iron peptonate, 50 Gm. of liq. mangani glycosati are mixed with it. The latter is made by dissolving 87 parts of potassium permanganate in 5000 of hot water, cooling to 60° C., adding 50 parts of glucose, collecting the precipitate after an hour, washing, pressing and dissolving with gentle heat in a mixture of 600 parts of glucose, 225 of solution of soda, and sufficient water containing 5 per cent. of alcohol to produce 1500 parts.

Liquor Ferri Saccharati cum Mangano is made by dissolving 200 Gm. of saccharated iron in 644 Gm. of water, and adding 50 Gm. of liq. mangani glycosati (see above), 100 Gm. of alcohol, 3 Gm. of tincture of orange, 1½ Gm. of aromatic tincture, 1½ Gm. of tincture of vanilla, and 5 drops of acetic ether.—Pharm. Jour., Oct. 23, 1897, 360.

Liquores.—The following are formulas for preparations used in the hospitals of New York city and edited by Dr. Chas. Rice:

Liquor Alumini Acetatis: Alumen, 3 Gm.; plumbi acetas, 14 Gm.; aqua, q. s. ad 500 Cc. Dissolve each salt in a portion of the water (cold), mix the two solutions and make up the volume to 16 fluid ounces. Unless otherwise directed, dispense the liquid without the precipitate. If the mixture is to be filtered, the lead sulphate may be prevented from passing through the filter by mixing the liquid with about one ounce of starch.

Liquor Boracis Compositus (Brown Drops): Acid. tannicum, 0.65 Gm.; sodii boras, 0.65 Gm.; glycerin, 4 Cc.; aqua camphor., q. s. ad 30 Cc. Use as eye-drops.

Liquor Boro-Salicylicus (Thiersch's Solution): Acid. salycylicum, 1 Gm.; acid. boricum, 6 Gm.; aqua, q. s. ad 500 Cc. For external use.

Liquor Pepsini Compositus: Pepsini puri, 5 Gm.; acid. hydrochlor. dil., 8 Cc.; glycerin, 15 Cc.; spir. gaulth., 5 Cc.; elixir aromat., 25 Cc.; aqua, q. s. ad 110 Cc. Dose 1 fluid drachm.

Liquor Zinci et Acidi Borici (Carter's Solution): Zinci sulph., 0.1 Gm.; acid. boricum, 1.0 Gm.; aqua camphoræ, 12 Cc.; aqua, q. s. ad 50 Cc. Use as eye drops.—Amer. Drugg., April 11, 1898, 189.

Fehling's Solution—Alleged Reduction by Mineral Acids.—The statement of M. Z. Jovitschitsch that mineral acids—hydrochloric, nitric, and sulphuric—possess the property of reducing Fehling's solution, has induced Otto Rosenheim and Philip Schidrowitz to make experiments which convince them that Jovitschitsch's statement is based on an error of observation. Adopting a method similar to that usually employed in the gravimetric estimation of sugars, 50 Cc. of Fehling's solution (stored in two solutions and mixed when required), were diluted by the authors with 25 Cc. of distilled water, heated to boiling, 25 Cc. of a 25 per cent. solution of the potassium salts of one of the acids in question run in from a pipette, and after ebullition had re-commenced, the liquid was kept boiling in one series for two, in the other for four minutes. The perfectly clear solution was filtered hot through a Soxhlet's asbestos tube under reduced pressure, the tube dried, heated in hydrogen in the usual manner, and finally weighed. As will be seen from the figures below, the results were practically identical with those obtained by the boiling of Fehling's solution alone :

	Boiled for two minutes. Grm. Cu.	Boiled for four minutes. Grm. Cu.
Fehling's solution alone	0.0028	0.0040
25 per cent. potassium chloride	0.0023	0.0040
25 per cent. potassium nitrate	0.0036	0.0044
Potassium sulphate (saturated at 18° C.)	0.0020	0.0040

—Chem. News, Dec. 31, 1897, 318.

Antiseptic Solutions—Coloration as a Precautionary Measure.—In view of the frequent accidents which have occurred from the use of antiseptic solutions, Dr. Maurange proposes a list of coloring matters which by their addition to the solutions, would give them a characteristic color and thus prevent their being taken internally. For solutions of *mercuric chloride* blues and violets are to be used thus : To a liter of the antiseptic add one drop methyl violet solution, 1 : 20 ; or two drops Nicholson's blue, 1 : 100 ; or fifty drops indigo carmine, 1 : 100 ; or five drops malachite green, 1 : 100. For solutions of *silver nitrate*, the same colorants may be used in the same proportions. For solutions of *mercuric oxycyanide* use, per liter, twenty drops of saturated solution of helianthine ; or three drops of aniline orange, 1 : 20 ; or four drops of fluorescine, 1 : 20. For solutions of *carbolic acid* use, per liter, two drops of fuchsine, 1 : 100 ; or ten drops of eosine, 1 : 100 ; or four drops of safranine, 1 : 100. It is recommended that these colorants be universally adopted for the purposes mentioned.—Can. Pharm. Jour., Aug., 1897. 43 ; from Gaz. Hebdom., 1897.

Antiseptic Solutions for the Treatment of the Hair.—Unna recommends the following :

1. *Acetic Sublimate Solution:* Acetic acid, 1.0 ; Van Swieten's solution, 100.0 Gm. Van Swieten's solution is composed of 1 part corrosive sublimate, 10 parts of alcohol, and 990 parts of water.

2. *Iodine-Sublimate Solution :* Mercuric chloride, 2.0 ; glycerin, 100.0 ; tincture of iodine, 900.0 parts.—Pharm. Centralh., 1897, 840.

Liquid Benzoin—A Convenient Preparation for Benzoinating Lard.—Richard M. Shoemaker, referring to the frequent adulterations and impurities in commercial benzoin, calls attention to a liquid benzoin which he recommends as being both convenient and efficient for benzoinating lard. It is prepared as follows : Macerate 20 Gm. of benzoin in 40 Cc. of ether for 12 hours; filter with proper precautions to avoid loss of ether; dissolve sufficient castor oil in the filtrate to make 15 Gm. of final product, and distill off the ether carefully. The deep amber-colored oleaginous product contains the benzoic acid and volatile principles of the benzoin, while the residue is destitute of odor or taste. The 15 Gm. of liquid benzoin so obtained are sufficient to make 1000 Gm. of benzoinated lard according to the formula given by the author (see under "Ointments"). —Amer. Jour. Pharm., Jan., 1898, 9–10.

Boro-Chloroform Alcohol—Formula for the Treatment of the Hair.—Unna recommends for the treatment of the hair an alcoholic solution of boric acid with a little chloroform, prepared in the following proportions: Boric acid, 1.0; chloroform, 5.0; alcohol, 100.0 Gm.—Pharm. Centralh., 1897, 840.

Alcoholic Solution of Tar—Formula.—Dr. A. R. L. Dohme communicates the following formula for an alcoholic solution of tar to be used for making syrup of tar: Washed tar, 50 Gm.; alcohol, sufficient to make 500 Cc. Dissolve.—Proc. Maryland Pharm. Assoc., 1897, 41.

Innocuous Color Solutions—Various Formulas.—The following formulas are given in "Pharm. Ztg." (1897, 515) for preparing colors suitable for liqueurs, confectionery and food:

1. *Red.*—(*a*) Mix cochineal, 6, with chalk, 2, and rub well together, then add gradually alcohol, 95 per cent., 12, and finally water, 15; set aside for a time, then filter. (*b*) Dissolve carmine, 2, in solution of potash, 12, and dilute with water to make 100.

2. *Yellow.*—(*a*) Use safflower either as an extract or as a tincture. (*b*) Yellow berries extracted with alcohol.

3. *Green.*—(*a*) Tincture of saffron, 1 : 20, with solution of indigo. The color is improved by a few drops of chloroform. (*b*) Tincture of saffron with solution of indigo carmine mixed with an equal volume of glycerin. (*c*) Chlorophyll in alcoholic solution.

MISTURÆ.

Mixtures—Various Formulas.—In the Formulary of the New York Hospitals, edited by Dr. Charles Rice, a large number of formulas are given, many of which may find their way into general use. The following may, therefore, be properly recorded here for convenient reference:

Mistura Acidi Salicylici: Acid. salicylicum, 8 Gm.; potass. acetas, 8 Gm.; sodii bicarb., 2 Gm.; glycerin, 15 Cc.; aqua, q. s. ad. 120 Cc. Dose: one fluid drachm.

Mistura Aconiti pro Infantibus (Measles Mixture): Tinct. aconiti, 1 Cc.; ammon. carbonas, 4 Gm.; aqua camphor., 30 Cc.; syr. tolu, 20 Cc.; aqua, q. s. ad 120 Cc. Dose: one fluid drachm every three hours for children ten years of age.

Mistura Alkalina: Potass. bicarb., 31 Gm.; tinct. hyosycami, 15 Cc.; aqua, q. s. ad 240 Cc. Dose: one-half fluid ounce in water, two hours after meals.

Mistura Alkalina Composita differs from the preceding in the addition of 15 Cc. of fluid extract of piper methysticum, all other proportions, as well as the dose, being the same.

Mistura Amara, Smith (Smith's Bitters): Equal parts by volume of tinct cinchonæ co. and tinct. gentianæ co. Dose: one fluid drachm.

Mistura Ammoniæ Anisata: Tinct. opii camph., spir. ammon. anis., glycerin, syr. scillæ co., syr. tolutani, of each equal volumes. Dose: one fluid drachm. Spiritus ammoniæ anisatus is prepared by dissolving 1 volume of oil of anise in 29 volumes of alcohol, and adding 5 volumes of water of ammonia.

Mistura Ammonii Carbonatis: Ammon. carb., 2 Gm.; ext. glycyrrhizæ fl., 4 Cc.; syr. ipecac, 8 Cc.; syr. senegae, 15 Cc.; syr. tolu., 15 Cc.; aqua cinnamomi, q. s. ad 120 Cc. Dose: one fluid drachm for children.

Mistura Ammonii Carbonatis et Camphoræ: Ammon. carb., 2 Gm.; spir. camphor., 4 Cc.; spir. æther. nit., 15 Cc.; syrupus, q. s. ad 90 Cc.—Dose: one fluid drachm.

Mistura Ammonii Chloridi: Ammon. chloridum, potass. chloras, of each 2 Cc.; syr. senegae, 15 Cc.; syr. ipecac., 12 Cc.; syr. tolu., 20 Cc.; ext. glycyrrhizæ fl., 8 Cc.; aqua cinnam., q. s. ad 120 Cc. Dose: one fluid drachm.

Mistura Ammonii Chloridi et Pruni Virginianæ: Ammon. chloridum, 2 Gm.; tinct. opii camph., 12 Cc.; syrup. ipecac., 12 Cc.; syr. prunivirg., 30 Cc.; syr. tolu, q. s. ad 120 Cc. Dose: one fluid drachm.

Mistura Antasthmatica (Fothergill): Ammon. iodid., 4 Gm.; ammon. bromid., 6 Gm.; syr. tolu, 45 Cc.; tinct. lobeliæ, q. s. ad 120 Cc. Dose: one fluid drachm.

Mistura Antidiarrhœica (G. D. D.): Spir. camphoræ, spir. menthæ pip., tinct. capsici, tinct. catechu co., tinct. opii, tinct. rhei arom., of each equal volumes. Dose: for adults, 20 to 40 drops; for children over five years, 5 to 10 drops, repeated with caution.

Mistura Anti-emetica: Sodii bicarb., 10 Gm.; spir. aether. nitr., 10 Cc.; aqua menth. pip., q. s. ad 120 Cc. Dose: 1 fluid drachm.

Mistura Anti-epileptica: Potass. iodid., 12 Gm., potass. bromid, 15 Gm., potass. bicarb., 8 Gm.; ammon. bromid., 4 Gm.; tinct. calumbæ, 15 Cc.; aqua, q. s. ad 120 Cc. Dose: 1 fluid drachm.

Mistura Anti-febrini: Acetanilidum, 3.5 Gm., spir. ammon. arom., 40 Cc.; glycerinum, q. s. ad 80 Cc. Dose: 1 fluid drachm.

Mistura Anti-rheumatica (I): Potass. acetas, 20 Gm.; vinum colchici seminis, 10 Cc.; aqua, q. s. ad 100 Cc. Dose: 1 fluid drachm.

Mistura Anti-rheumatica (II): Potassii iodidum, 8 Gm.; sodii salicyas, 8 Gm.; vinum colchici seminis, 8 Cc.; aqua, q. s. ad 120 Cc. Dose: ½ fluid ounce.

Mistura Anti-scorbutica: Potass. bitart., 10 Gm.; acid. citric., acid. tartaric., of each 15 Gm.; syrupus, 60 Cc.; aqua, q. s. ad 250 Cc. Dispense with a "shake" label. Dose: ½ fluid ounce.

Mistura Apomorphinæ: Apomorph. hydrochlor., 0.032 Gm.; acid. hydrochlor. dil., 0.6 Cc.; syrupus, 30 Cc.; aqua menth. pip., q. s. ad 60 Cc. Dose: 1 fluid drachm.

Mistura Bichloridi et Cinchonæ (Mistura Huxhami Composita): Hydrarg. chlor. corros., 0.07 Gm.; tinct. cinchonæ co., 130 Cc. Dose: one fluid drachm.

Mistura Biniodidi (*Taylor*)—"Mixed Treatment, Taylor:" Hydrarg. iod. rubr., 0.032 Gm.; potass. iodid., 8.3 Gm.; syr. sarsap. co., 30 Cc.; aqua, q. s. ad 60 Cc. Dose: one fluid drachm.

Mistura Bromidi et Cannabis: Ammon. bromidum, 17 Gm.; tinct. cannabis indicæ, 10 Cc.; syr. tolu, q. s. ad 65 Cc. Dose: one fluid drachm.

Mistura Bromidorum Composita (Compound Bromides): Potass. brom., ammon. brom., of each 10 Gm.; spir. aether. co., 6 Cc.; spir. ammon. arom, 8 Cc.; aqua, q. s. ad 120 Cc. Dose: two to four fluid drachms.

Mistura Bronchi: Ammon. carb., 1.1 Gm.; syr. pruni virg., 3 Cc.; tinct. opii. camph., 6 Cc.; syr. ipecac., 9 Cc.; aqua, q. s. ad 100 Cc. Dose: 1 fluid drachm for children.

Mistura Cannabis Indicæ Composita: Acetanilidum, 3.5 Gm.; tinct. cannab. indicæ, 5 Cc.; spir. ammon. arom., 40 Cc.; glycerinum, q. s. ad 80 Cc. Dose: 1 fluid drachm.

Mistura Capsici, Nucis et Zingiberis ("C. N. G. Mixture"): Tinct. capsici, tinct. zingiberis, of each, 2 Cc.; tinct. nucis vomicæ, 6 Cc.; aqua, q. s. ad 65 Cc. Dose: 1 fluid drachm.

Mistura Colchici (Gout Mixture): Vinum colchici seminis, 15 Cc.; magnes. carbon., magnes. sulph., of each 15 Gm.; spir. æther nitr., 30 Cc.; aqua, q. s. ad 240 Cc. Dose: ½ fluid ounce.

Mistura Olei Morrhuæ cum Calce: Oleum morrhuæ, 250 Cc.; liquor calcis, 120 Cc.; tinct. quillajæ, 15 Cc.; glycerinum, 30 Cc.; oleum gaulth., oleum sassafras, oleum anisi, of each 15 drops; mucil. acaciæ, q. s. ad 500 Cc. Dose: 1 to 4 fluid drachms.

Mistura pro Bronchidide (Bronchitis Mixture): Ext. ipecac fl., ext. belladon. rad. fl., of each 2 Cc.; tinct. opii, 15 Cc.; quininæ sulph., 2 Gm.; ac. sulph. dil., q. s.; syr. sarsaparillæ, 350 Cc.; aqua, q. s. ad 1000 Cc. Dose: 1 fluid drachm.

Mistura pro Delirio ("D. T. Mixture"): Potass. bromidum, 26 Gm.; chloral, 13 Gm.; tinct. digitalis, tinct. capsici, tinct. zingiberis, spir·

ammon. arom., syr. aurantii, of each 25 Cc.; aqua, q. s. ad 200 Cc. Dose: one-half fluid ounce.

Mistura pro Diarrhœa, Smith: Tinct. opii, tinct. capsici, spir. camphor, of each 30 Cc.; chloroformum, 10 Cc.; alcohol, q. s. ad 150 Cc. Dose: 20 to 30 minims.

Mistura pro Diphtheria (Jacobi's Special): Potass. chloratis, 5 Gm.; tinct. ferri chlor., 10 Cc.; glycerinum, 60 Cc.; aqua, q. s. ad 240 Cc. Used as a gargje and internally in doses of ½ fluid ounce.

Mistura pro Dysenteria: Tinct. opii camph., 20 Cc.; tinct. rhei arom., 10 Cc.; mist. cretae, q. s. ad 115 Cc. Dose: 1 fluid drachm.

Mistura Diuretica Alkalina: Potass. acetas, potass. citras, potass. bicarb., of each 20 Gm.; aqua, q. s. ad 240 Cc. Dose: 1 fluid drachm.

Mistura Diuretica cum Tritico: Potass. acetas, potass. citras, potass. bicarb., of each 8 Gm.; ext. tritici fl., 15 Cc.; aqua, q. s. ad 120 Cc. Dose: 1 fluid drachm.

Mistura Expectorans Specialis: Morphinæ sulph., 0.13 Gm.; ammon. chloridum, 8 Gm.; spir. chloroformi, 8 Cc.; syr, pruni virg., 60 Cc.; mist. glycyrrhizæ co., q. s. ad 120 Cc. Dose: 1 fluid drachm.

Mist. Ferri Citro-Salicylici: Acidum salicyl, potass. citras, of each, 8 Gm.; Tinct. ferri chlor., glycerinum, of each, 8 Cc.; oleum gaultheriæ, 5 drops; aqua, 15 Cc.; liquor ammon. acetatis, q. s. ad., 120 Cc. Dissolve the potassium citrate in the water, and add the tincture of ferric chloride, oil of gaultheria and glycerin. Dissolve the salicylic acid in the solution of ammonium acetate, mix both solutions, and add enough solution of ammonium acetate to complete the volume. Dose: 1 fluid drachm.

Mistura Hypophosphitum: Liq. sodii arsenatis, 8 Cc.; syr. hypophosphitum co. (N. F.), q. s. ad 120 Cc. Dose: 1 fluid drachm in water, after meals.

Mistura Nervina (Hammond's Mixture, Vance's Mixture): Strychninæ sulph., 0.06 Gm.; ferri. phosph., 8 Gm.; quinin. sulph., 8 Gm.; acid. phosph. dil., 120 Cc.; syr. zingiber., q. s. ad. 250 Cc.

Mistura Olei Lini: Oleum lini, 300 Cc.; oleum gaultheriæ, oleum cinnam., acidi hydrocyan. dil., of each 5 Cc.; glycerinum, 15 Cc.; syrupus, 200 Cc.; mucil. chondri (N. F.), q. s. ad 1000 Cc. Dose: 1 to 4 fluid-drachms.

Mistura pro Tussi (Thomson's Cough Mixture): Chloral, 15 Gm.; tinct. opii camph., tinct. lobeliæ, of each 20 Cc.; tinct. sanguinariæ, 40 Cc.; chloroformum, spir. gaultheriæ, of each 5 Cc.; syr. sarsaparilla; co., 450 Cc.; aqua, q. s. ad 1000 Cc. Dose: 1 to 4 fluid drachms.

Mistura Rhei et Sodæ: Sodii bicarb., 4 Gm.; ext. rhei fl., 4 Cc.; spir. menth. pip., 4 Cc., aqua, q. s. ad 120 Cc. Dose: 1 fluid drachm.

Mistura Salolis et Copaibæ Composita: Salol, 5 Gm.; copaiba, 15 Cc.; potass. citras, 15 Gm.; ext. hyoscyam. fl., 5 Cc.; mucil. acaciæ, syrupus, of each 10 Cc.; aqua menth. pip., q. s. to make 80 Cc. Dose: 1 fluid drachm.

Mistura Tænicida: Oleoresina aspidii, 4 Cc.: oleum terebinth. nect., 20 drops; chloroformum, 15 drops; mucil. acaciæ, q. s. ad 30 Cc. Dose: ½ fluid ounce at night; the other in the morning. Mix thoroughly before taking a dose.

Mistura Tonica (Thomson's Tonic): Ammon. carbon., ferri et ammon. citras, of each 1 Gm.; tinct. gentianæ co., tinct. quassiæ, of each 30 Cc.; syrupus, 25 Cc.; aqua, q. s. ad 120 co. Dose: 1 fluid drachm.—Amer. Drugg., April 25, May 10 and 25, 1898, 221, 252 and 281.

Mistura Glycyrhizæ Composita.—Convenience of a Concentrated Preparation.—John K. Williams says that the official compound licorice mixture is a frothy, fermentative mixture, and not elegant at best. He prepares a concentrated preparation by omitting the bulk of the water, and adding glycerin in lieu of sugar. The other ingredients being the same, water is used, so as to make the volume just one-half that required by the Pharmacopœia. When dispensing, equal volumes of this concentrated preparation and water are to be mixed. The advantages are permanence, and no frothing of the concentrated mixture when it is shaken.—Bull. Pharm., Sept. 1897, 408; from Proc. Conn. Pharm. Assoc., 1897.

Brown Mixture—Improved Formula.—Dr. A. R. L. Dohme recommends the following formula for criticism or endorsement to the Maryland Pharmaceutical Association: Pure extract of licorice (made directly from root), 30 Gm.; camphorated tincture of opium, 120 Cc.; antimonial wine, 60 Cc.; spirit of nitrous ether, 30 Cc.; mucilage of acacia, 100 Cc.; granulated sugar, 600 Gm.; caramel, 8 Cc.; water, sufficient. Dissolve the extract of licorice and caramel in 300 Cc. of water, add the tincture, wine and spirit, previously mixed, filter into a bottle containing the sugar and mucilage, and wash the filter with sufficient water to make the measure of the finished product up to 1000 Cc., straining the mixture through flannel after the sugar has been dissolved by agitation.—Proc. Maryland Pharm. Assoc., 1897, 41.

Cholera Drops—A New Formula.—Wm. Weber recommends the following formula for cholera drops, which he has supplied with satisfaction for some time: Tincture of coto, tincture of cinnamon, of each 3 ozs., 6 drams; tincture of opium, 1 oz., 2 drams; tincture of ginger, 1 oz., 7 drams; glycerin, 4 ozs., 3 drams. A slight precipitate forms on standing which must be filtered off. The dose is one-half to one teaspoonful, given in cases of diarrhœa and colic. It has a good taste and is best taken without dilution.—Amer. Drugg., Dec. 25, 1897, 366.

Colic-Drink for Horses—Efficient Formula.—Edward Swallow recommends the following "drink" for horses suffering from colic: Tincture of opium, 1 oz.; oil of turpentine, ½ oz.; spirit of nitrous ether, 2 ozs.;

linseed oil, 8 ozs. This should relieve colic, cramps, or pain within half an hour; if not, send for the veterinary at once.—Amer. Drugg., March 25, 1897, 157.

Essence of Tamarinds—Semi-Official Formula.—The following formula has been introduced into the new supplement (1897) to the third edition of the German Pharmacopœia, with the object of supplying a demand for a proprietary medicine known under the name of essence of tamarinds: 500 parts of tamarind are digested with 2500 parts of hot water for some hours, and strained without pressure. The liquor is evaporated to 1000, and neutralized with magnesium carbonate. An infusion is also prepared from 50 parts of Alexandrian senna, 2 parts of calcined magnesia, and 500 of water, added to the tamarind-liquor, the whole heated to the boiling point, strained through flannel, and evaporated to 800 parts. To the liquid 50 parts each of simple syrup, syrup of orange, syrup of cinnamon, and dilute spirit are added, and the mixture set aside to deposit.—Pharm. Journ., Oct. 23, 1897, 360.

OLEATA.

Oleate of Mercury—Preparation.—The "Pharm. Rundschau" recommends the following method for preparing oleate of mercury: Mix 25 parts of yellow oxide of mercury in a porcelain mortar with 25 parts of alcohol, and add 75 parts of oleic acid. Triturate the mixture until it becomes sufficiently thick so that the heavier particles of oxide no longer deposit at the bottom. Let it stand 24 hours, then heat to 60° C. and triturate, continuing the heat, until the weight of the product is 100 parts. The mass so obtained is semi-transparent, of a light-yellow color and the consistence of an ointment. It retains the odor of oleic acid. It is slightly soluble in alcohol and ether, more readily in benzin, and very easily in fixed oils. If 1 Gm. of oleate of mercury be mixed with 10 Gm. of crushed glass, 20 Gm. of dilute alcohol added, and the mixture heated at 35° to 40° C. for 1 hour, with frequent shaking, 10 Gm. of filtrate, on evaporation to dryness on a water-bath, should not leave more than 0.06 Gm. of residue. If 1 Gm. of oleate be boiled with 5 Gm. of concentrated nitric acid for a few minutes, then 5 Cc. of water added, and the mixture filtered when cold, no precipitate should form in the filtrate, on the addition of three times its volume of dilute sulphuric acid.—Pharm. Era, May 5, 1898, 671.

PILULÆ.

Pills—Care in Handling and Dispensing Them Modernly.—Leon L. Watters speaks interestingly about handling pills, tablets and triturates. Formerly a druggist's ability to form a good and presentable pill was a safe criterion by which to judge his fitness, and individual pharmacists prided themselves upon the possession of some special knack by means of which a particularly handsome pill could be turned out from a prescription which in the hands of others resulted in unsightly manner. But the era of hand-made pills seems to be rapidly drawing to a close; and with the advent of the machine-made article, there seems to have come a tendency to rely too closely upon the manufacturer's label as a guarantee of reliability. Many labels, it is true, are perfectly reliable, but others are not; and since the one thing demanded of any pharmaceutical preparation, be it pill, powder, or tincture, is that it shall produce the desired medicinal effect, it behooves the pharmacist to be very circumspect in his purchases, to handle only the products of manufacturers of established reputation, so that, under modern practice and demand, he may not unintentionally become the distributor of pills grossly inaccurate in composition. A druggist can only be absolutely sure of the quality and composition of pills that he makes himself; but the condition of pharmacy is such that it is impossible for him to manufacture all classes of compounds demanded, and he is consequently compelled to supply his stock by purchase. These remarks apply to all purchased preparations, and particularly to compound tablets and tablet-triturates, the combinations of which are so numerous that pharmacists cannot always rely upon their own facilities to prepare them, not to speak of the necessity to supply the products of designated manufacturers. The author makes some practical suggestions concerning the preservation of pills and tablets. They should be kept in a cool dry place, shielded from the direct sunlight, and in the case of those seldom called for, in containers sealed with beeswax or paraffin. The same pill, made by different manufacturers, often differs in appearance, color, shape, size, &c., and in dispensing them it is therefore advisable to designate the kind supplied on the prescription, whether sugar or gelatin coated, ovoid or globular; if freshly prepared, what kind and amount of excipient is used to form the mass, the kind of dusting powder used, &c —Merck's Rep., May 1, 1898, 267.

Pills—Preparation and Coating.– Havasse has made experiments upon coating pills and their preparation with this object in view, from which he draws the following conclusions: 1. If the excipient contains wax, it must not be present in so great a quantity as to raise the melting point of the mixture above the temperature of the stomach. The maximum quantity of wax is 1 part to 10 parts of active substance. 2. Pills intended to be keratinized should not be made with ordinary excipients. 3. Coating and excipient should be such as to permit ready solution or disintegration of the pills in the gastric fluid. 4. In cases where the preceding conditions cannot be fulfilled, it is better to abandon the pill form and administer the remedy in capsules or wafers.—Pharm. Era, Jan. 27, 1898, 128; from Jour. de Pharm. de Liege.

Pills—Method of Salol-Coating.—R. P. Hayden describes the following method for salol-coating pills: The pills to be coated should be hard, uniform in size, perfectly round, and free from dusting powder, such as lycopodium, etc., which prevents the salol from adhering. The requisite amount of salol is melted in an evaporating dish by gentle heat, the liquid allowed to cool down to about 50° C., and the pills are then placed into the dish, which is rotated until the salol becomes cool. If the coating is insufficient, the pills are again treated in the same way. The very rough coating so produced, is rendered perfectly smooth by again rotating them in a dish which has been heated sufficiently so that the coating may become superficially melted. They may thus be made to present a smooth and glossy appearance, and must then be allowed to cool in a wooden dish or pill finisher, to which they will not adhere while cooling.—Proc. Maryland Pharm. Assoc., 1897, 43.

Ovules—A Gelatin Pill.—According to Dieudonne "ovules" are made from a mass, prepared as follows, which is unalterable under ordinary conditions, but melts completely when kept at a temperature of 37° C. for several hours: Soak 10 parts of gelatin in 10 parts of water for 6 hours, and when completely swelled heat with 110 parts of glycerin until the water has completely evaporated. Then pour into suitable moulds. This mass is medicated either by adding the medicinal agent direct to the melted mass, or by reserving a portion of the glycerin—say 10 parts—to incorporate with the medicinal agent and then adding to the melted mass. Examples are given of belladonna, ichthyol, and iodoform ovules.—Merck's Rep., July 15, 1897, 434; from Journ. de Pharm., 1897, 201.

Pills—Various Formulas.—The following formulas for pills are given in the recent (5th) Edition of the N. Y. Hospital Formulary, edited by Dr. Chas. Rice:

Pilulæ Acetanilidi Compositæ (Migraine Compound): Acetanilidi, 13 Gm.; camph. monobrom., caffeinæ citras, of each 3.2 Gm. To make 100 pills. Dose: 1 to 5 pills.

Pilulæ Aloes et Podophylli Compositæ (Janeway's Pills): Aloe, 0.5 Gm.: res. podophylli, 3.2 Gm.; ext. belladon. fol. alc., ext. nuc. vomicæ, of each 1.6 Gm. To make 100 pills. Dose: 1 to 3 pills.

Pilulæ Aperientes (Lusk): Ext. aloes, 5.5 Gm.; pulv. rhei, 3.2 Gm.; ext. nuc. vomicæ, 1.6 Gm.; to make 100 pills. Dose: 1 to 3 pills.

Pilulæ Diureticæ (Fothergill's Pills): Hydrarg. chlormite, pulv. scillæ, pulvis. digitalis, of each 6.5 Gm.; to make 100 pills. Dose: 1 to 2 pills.

Pilulæ Gastricæ (Thomson's Gastric Pills): Argenti nitras, 1.07 Gm.: zinci oxidum, 3.2 Gm.; bismuthi subnitr., 13 Gm. To make 100 pills. To prevent the decomposition of the silver nitrate, petrolatum should be used as excipient, and kaolin or chalk as diluent. Dose: 1 pill.—Amer. Drugg., May 25, 1898, 283.

Cascara Pills.—Formula.—The following formula for an efficient cascara pill is given in "Pharm. Ztg." (xlii., 282): Extract of cascara, 2

Gm.; extract of rhamnus frangula, 1 Gm.; powd. aloes, 4 Gm.; powd. gentian, 4 Gm.; medicinal soap, sufficient to make a mass, which divide into 80 pills.

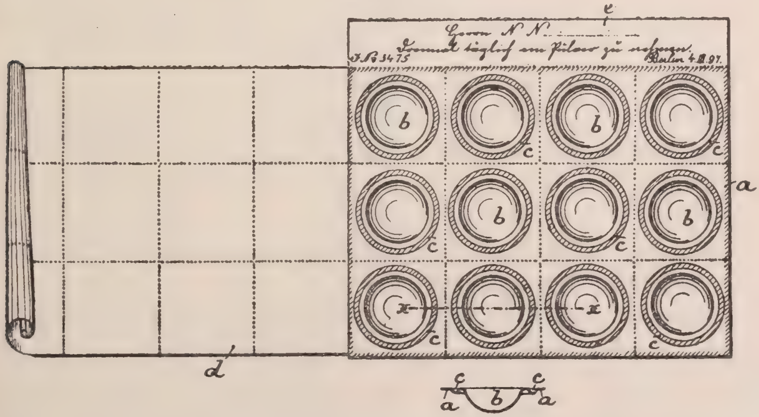
Distemper Pills for Dogs—Formula.—Edward Swallow recommends the following pills for distemper of dogs: Powdered squill, 1 gr.; gum ammoniac, 2 gr.; quinine sulphate, ¼ gr.; confection of rose, q. s. for 1 pill. One such pill is to be given once or twice a day, after a preliminary treatment with an aperient, castor oil, epsom salt, etc. The eyes and nose of the animal are to be washed with warm water containing a little boro-glycerite, and the eyelids anointed with vaseline or almond oil.—Amer. Drugg., April 11, 1898, 187.

Horse Balls—Formula.—Edward Swallow recommends the following formula for a mass from which physic-balls for horses are to be made: Barbadoes aloes, 2 ozs.; powdered ginger, 1 oz.; oil of cloves, 1 drachm; soft soap, sufficient to make a mass. Divide into balls, weighing 3, 4, 5 or 6 drachms, according to the size and weight of the animal. The balls should be rolled in licorice powder, then in waxed paper, and last in white paper. The latter is removed, but the waxed paper, which should be fastened on the edges with paste, is administered with the ball. The ball may also be given in capsules.—Amer. Drugg., March 21, 1897, 157.

PULVERES.

Powders—New Method of Dispensing.—Max Rosenthal has devised an arrangement for dispensing powders whereby each dose is hermetically sealed in paper capsules, and the necessity for a box or other container is avoided. The arrangement is shown by Fig. 62 in outline and in section. It consists of a carton, *a*, in which as many capsule-shaped depressions, *b*,

FIG. 62.



Carton for Dispensing Powders.

are provided as there are powders to be dispensed. Each depression is surrounded with a ring, *c*, also depressed, which is filled with gum arabic or other adhesive. The individual capsules are easily separable from each other by the aid of perforations shown by the dotted lines in the drawing. On one of the sides of the carton, a sheet of paper, *d*, perforated to correspond with the perforations in the carton, is attached. This serves the purpose of sealing the capsules, *b*, after they have been filled with the powder, the adhesive rings, *c*, being moistened by means of a pencil, and the paper then attached by suitable pressure. A second paper, shown by *e*, may be attached to the carton for the purpose of the directions for taking the powders, which, owing to the perforations, are easily detached with their containers—the latter being easily opened by tearing off the paper with which they are sealed. The comparative depth of the capsules and of the ring for the adhesive is shown by the cross-section at *b* and *c.c*, the extension of the cover proper at *a.a.*—Pharm. Ztg., Jan. 19, 1898, 52.

Powders—Various Formulas.—The following formulas are given in the recent (5th) edition of the N. Y. Hospital Formulary, edited by Dr. Chas. Rice, and may here prove convenient for reference:

Pulvis Depilatorius (Depilatory: for removing hair from the skin previous to operation): Barii sulphidum, 3 parts; triticum farinæ, 1 part. To be made into a paste with water. The barium sulphide must be as fresh as possible. The paste is applied to the part to be denuded of hair, the excess of the latter being trimmed of with the scissors. From time to time a small part of the surface should be examined, and when it is seen that the hair can be removed, the mass should be washed off.

Pulvis pro Coryza (Thomson's Snuff): Menthol, 0.13 Gm.; Sodii bicarb., 0.13 Gm.; cocainæ hydrochlor., 0.26 Gm.; magnes. bicarb., 0.26 Gm.; sacchar. lactis, 12 Gm. To be used as snuff occasionally.

Pulveres pro Influenza.—Anti-Grippe Powders:

Formula No 1: Codeina, capsici pulv., of each 0.2 Gm.; quininæ sulph., 2.6 Gm.; acetanilidum, 6.4 Gm. To be divided into 20 powders. Dose: 1 powder.

Formula No. II: Ext. bellad. fol. alc., 0.2 Gm.; pulv. ipecac. et opii, 2.6 Gm.; phenacetin, 6.4 Gm.; quininæ sulph., 6.4 Gm. To be divided into 20 powders. Dose: 1 powder.

Formula No. III: Apomorphinæ hydrochlor., 0.032 Gm.; antipyrina, 4.5 Gm.; quininæ sulph., 4.5 Gm. To be divided into 20 powders. Dose: 1 powder.

Formula No. IV: Codeina, .02 Gm.; sodii bicarb., 2.6 Gm.; phenacetin, acetanilidum, of each 4 Gm. To be divided into 20 powders. Dose: 1 powder.

Pulveres Pro Malaria (Thomson): Opii pulv., 0.32 Gm.: quininæ sulph., pulv. zingiberis, of each 6 Gm. To make 20 powders. Dose: 1 powder.

Pulveres Quininæ Compositi (Clark's Powders): Pulv. opii, 1.3 Gm.; pulv. capsici, 4 Gm.; quininæ sulph., 13 Gm. To make 20 powders. Dose: 1 powder.—Amer. Drugg., April 25 and June 10, 1898, 283 and 310.

Diachylon Powder—Formula.—The "Zeitschr Oest. Apoth. Verein," gives the following formula for "diachylon powder," which is very extensively used in both Germany and Austria: Lead acetate, 2, dissolved in distilled water, 10; castile soap, 3, also dissolved in distilled water, 15. The two solutions are mixed, and each part of the precipitate of lead oleate formed is triturated with starch, 10. To the mixture 3 per cent. of boric acid is added. Another formula for a similar preparation is: Lead plaster, 15; yellow wax, 5; ether, 50. Dissolve and add starch powder and French chalk, of each, 90; boric acid, 3; and bergamot sufficient to perfume.—Pharm. Jour., Nov. 6, 1897, 416; from L'Union Pharm., xxxviii., 298.

Seidlitz Powders—Examination of Different Samples.—Prof. D. M. R. Culbreth discusses the subject of seidlitz powders interestingly, their history, introduction to pharmacopœial recognition, proper composition, commercial modification and uses. An examination of twelve duplicate samples of these powders from different druggists gave the following results:

	Weight of blue papers. Grains.	Weight of white papers. Grains.
1	142—151	39.5—40
2	184—178	35.5—32
3	157—160	39—36
4	163—182	39—42
5	166—169	55.5—48
6	179—168	39.5—43
7	133—146	62—54
8	204—188	47—40
9	251—228	42.5—38
10	163—178	37.5—36.5
11	181—174	32—30
12	156—163	34—37

These variations, which afford an interesting study, are very evidently due to the common practice of measuring instead of weighing or accurately dividing a given weighed quantity of the powder. In four cases one or both powders were deficient in the blue papers, while in all the others there was a quarter or less excess over the official quantity. The white powder, on the other hand, weighed more with a single exception than officially required (35 grains), the increased amount being in some cases largely in excess necessary to neutralize the alkalinity of the blue powder, while in others it was insufficient. The remarkable part of the author's results is the fact that so large a number of pharmacists should be so careless to their own interests as to dispense a larger portion of ingredients than is necessary or possible under careful and proper manipulation.—Drugg. Circ., Oct., 1897, 274.

Saccharated Carbonate of Iron—B. P. Method of Assay.—The British Pharmacopœia of 1885 directs that saccharated carbonate of iron should be dissolved in excess of dilute phosphoric acid and titrated with volumetric solution of bichromate of potash. In view of the statement made by several experimenters that it is perfectly immaterial whether phosphoric acid or some other mineral acid—hydrochloric or sulphuric—be used in this process of assay, J. F. Liverseege has undertaken a series of experiments, the results of which are communicated in detail. These show that correct results were obtained with cold phosphoric acid, but that sulphuric acid indicated 2 or 3 per cent. of ferrous sulphate too much, and that with hydrochloric acid the excess was 11 per cent. Heating on the water-oven, even for ten minutes, introduced an error of 25 per cent., even if phosphoric acid was used. These experiments show that the action of cold dilute phosphoric acid on the sugar has no prejudicial effect, and that the strength of the sample of saccharated carbonate given (33.6 per cent. $FeCO_3$) was correct, the higher results given when the other acids were used being due to their action on sugar. Taking dilute phosphoric acid (B. P.) as of a 4.6 equivalent strength and the official bichromate of potassium solution as $\frac{3}{10}$N., saccharated carbonate of iron can be conveniently assayed by adding 10 Cc. of 3 equivalent phosphoric acid to ½ Gm. of the salt, allowing to stand for fifteen minutes, with an occasional stir, adding 50 Cc. of water, and titrating with decinormal solution of bichromate of potassium. Multiplication of the number of cubic centimeters used by 2.32, will give per cent. $FeCO_3$ present.

Experiments were next made to ascertain if this method could be used for the assay of carbonate-of-iron pills. The iron salt was rubbed up in a mortar successively with the confection of roses, or glycerine, and the acid. The results appear to show that the prejudicial effect of the confection of roses on the estimation is sufficient to make an accurate assay of the ferrous salt in the pill impossible—a conclusion which is supported by the results of the analysis of some carbonate-of-iron pills three months old. Chem. & Drugg., Sept. 18, 1897, 492–493.

Condition Powder for Horses—Formula.—Edward Swallow makes an efficient condition powder for horses by mixing together equal quantities of the following drugs, all in fine powder: Gentian, aniseed, caraway, linseed, coriander, resin, fenugreek, licorice root and saltpetre, and adding two drachms of oil of cloves to a pound of the mixture. One or two tablespoonfuls of this powder, according to the size of the animal, is given well mixed with the food, night and morning, for a week or two; then once a day.—Amer. Drugg., March 25, 1897, 157.

RESINÆ.

Official Resins—Preparation with Acetone.—Edward T. Hahn has experimented to determine the availability of acetone as a solvent for preparing the official resins, since it possesses advantages over both alcohol and ether in point of cost, and appears to be otherwise well adapted. He found that jalap, which yielded 6.5 per cent. of resin by the official method, yielded 7.5 per cent. when acetone was used in the place of alcohol, podophyllum yielded 4 per cent. to alcohol, and 4.5 per cent. when acetone was employed; while scammony, in two examples, yielded the same percentage to both solvents, viz., 60 and 63 per cent. There was no marked difference in color between the samples of resin prepared from the same drug with the two solvents. The resins prepared with acetone were soluble in alcohol, and those prepared with alcohol were soluble in acetone. This clearly indicates at least a great similarity in the two products, and makes it quite probable that acetone might economically and conveniently replace alcohol in the preparation of the three resins experimented upon.—Amer. Jour. Pharm., Jan., 1898, 21–23.

Podophyllin—Distinction of the East Indian from the American Resin.—Edgar J. Willard observes that the large yield of resin from the Indian species—*Podophyllum emodi*—has led some manufacturers, particularly the English, to supply the resin from this source under the title of podophyllum resin, B. P. To distinguish between the two, the solubility tests, based on Lehman's observation that the resin is soluble in 10 parts of alcohol and in 100 parts of ammonia water, will not do, since the official resin is not wholly soluble in 100 parts of ammonia, while the resin from Indian podophyllum, when properly prepared, is perfectly soluble in alcohol. The color of the product is also not a criterion, nor is a color-reaction with concentrated sulphuric acid, observed by the author, very decided: the Indian resin producing an orange to red color with strong sulphuric acid when a little of it is sprinkled on a few drops of the acid on a white surface, while, under the same conditions, the official resin gives a yellow color tending to brown. A more useful test is the following: To 0.3 Gm. of the resin in a test-tube add 3 Cc. of diluted alcohol, sp. gr. 0.920 and 0.5 Cc. of solution of potash, B. P., and shake gently by rotating the test-tube. In the case of the Indian resin, the mixture becomes a semi-solid gelatinous mass in a few seconds, or, under circumstances, after heating to boiling and cooling; whereas the official resin produces a dark fluid that shows no signs of gelatinizing even after standing several days. —Pharm. Jour., Mar. 26, 1898, 304.

Baptisin—Satisfactory Process of Preparation.—Having occasion to prepare some baptisin—the resinoid of *Baptisia tinctoria*—Lewis Ouch found rather vague and indefinite directions for its preparation, but found the following method to give the most satisfactory results. The crushed root was moistened with rectified spirit, and packed in a percolator and allowed to stand for twelve hours. It was then slowly percolated with spirit till exhausted, 1 gal. being required for each 4 lbs. of root. The tincture was of a dark-brown color, and after recovering most of the spirit by distillation, the resin was dried and powdered, and consisted of a non-hygroscopic powder of a light-brown colour readily soluble in spirit. The yield was about 10 per cent. It was found that if a weaker spirit were employed the resinoid obtained was more difficult to powder and readily became damp on exposure.—Chem. & Drugg., Sept. 25, 1897, 524.

Hamamelin—Preparation from the Leaves and Bark of Hamamelis Virginica.—On consulting the literature on the subject, Lewis Ouch ascertained that the resinoid hamamelin was prepared both from the bark and the leaves of *Hamamelis Virginica*, but that the processes given were quite at variance. He therefore prepared the resinoid by the following process:

The coarsely-powdered leaves were macerated in rectified spirit for twenty-four hours, then packed in a percolator and carefully exhausted with spirit, two gallons being employed for each pound of the leaves taken. After recovery of most of the spirit by distillation, the extract obtained was dried at a low temperature. By this method nearly 7 per cent. of a dark-brownish extractive, possessing a peculiar resinous smell, and of a slightly hygroscopic nature, was obtained.

A quantity of the bark was next taken, and treated in a similar manner, and this gave about 16 per cent. of a light-brown resinoid, which was more readily reduced to powder than the foregoing.

A third batch was prepared from the leaves, using spirit of sp. gr. .920. This yielded about 12 per cent. of resinoid, very similar in appearance to the last named.

Suppositories prepared from the three samples of hamamelin were submitted to trial by a medical practitioner, who reported that those made with hamamelin prepared from the leaves with rectified spirit were far more efficacious than those containing the resinoid from the bark.—Chem. & Drugg., Jan. 15, 1898, 86.

Xanthoxylin—Preparation.—Lewis Ouch observes that the resinoid, xanthoxylin, is apparently made indiscriminately from the barks of *Xanthoxylum fraxineum* and *X. carolinianum*. He has prepared the resinoid from the bark of the first mentioned as follows: The bark in coarse powder was thoroughly moistened with spirit (sp. gr. .828), and allowed to stand for twenty-four hours, then packed in a percolator and slowly exhausted with more of the menstruum, about two gallons being employed for each pound of bark taken. After distillation of the tincture to recover most of the spirit, the residue was evaporated at a low temperature and carefully dried. In dealing with 28-lb. quantities of the bark in this manner, about 9 per cent. of resinoid was obtained. This was of a chocolate-brown color, slightly hygroscopic, but readily reduced to powder in a warm dry atmosphere.—Chem. & Drugg., April 2, 1798, 548.

SAPONES.

Castile Soap—Examination of Typical Good Commercial Samples.—Ferd. A. Sieker has had occasion to examine numerous samples of castile soap during the last four years, but has not found all the tests of the U. S. P.—which he passes in review—to be accurate or convenient. He describes modification of various tests. Instead of determining the amount of water, he determines the percentage of fatty acids insoluble in water. The test for animal fat, revealed by gelatinization of a 4 per cent. alcoholic solution on cooling, is probably not entirely reliable, since soaps containing only a small amount of animal fat will not gelatinize. The method for determining sodium carbonate cannot be regarded as accurate, and is suggested to be replaced by Dieterich's method proposed in Helfenberger Annalen, 1891. The U. S. P. method for determining the limit of alkalinity is also unreliable. It will not give concordant results in the hands of different persons, nor does it give the amount of alkalinity in the true sense of the word. The simple method of Dieterich is recommended for this purpose: Dissolve 1 Gm. of the soap in 10 Cc. of alcohol by the aid of heat, cool to 50° C., and add 0.5 Cc. $\frac{N}{10}$ HCl when the addition of 1 drop of phenolphthalein T. S. should cause no reddish color. Concerning the elaidin test, which was reported by Knox some years ago (see Proceedings 1894, 174), in connection with the examination of eight samples of castile soap, Mr. Sieker observes that such fats as lard and suet cannot very well be revealed by the color of the resulting elaidin and elaidic acid. Furthermore, the congealing point of the fatty acids is higher than that of the respective oils, and, for this reason, the solidification of the fatty acids on treatment with nitric acid might take place even if the oil was not perfectly pure. The author gives the complete results of only three samples of soap, as in these only was the character of the fatty acids determined, the tabulated statement indicating the directions in which castile soap should be examined. Numerous other soaps were examined, and most of them found to conform to all the pharmacopœial requirements. A number of them were excessively alkaline. The four per cent. alcoholic solution of only one sample congealed on cooling. Samples possessing a rancid odor, which is due to unsaponified fat, or which were discolored, were not included in the examination made. In the case of the three samples represented in the table, the most noteworthy result is the low iodine figure and the high melting and congealing points of the fatty acids. This would seem to indicate that the soaps were either prepared from olive oil that contained more palmitin and stearin, or that some suet, lard or stearic acid was added, perhaps with the object of making a harder soap.—Pharm. Review, Feb., 1898, 94–98.

Soft Soap—Examination of Commercial Samples and Improved Method of Preparation.—Ferd. A. Sieker observes that green or soft soap is recognized by both the U. S. and German Pharmacopœias, the formulas for their preparation being identical. Linseed oil is directed to be used with 20.25 per cent. of its weight of absolute potassium hydroxide and 10 per cent. of its weight of alcohol. No definite yield is prescribed, but assuming that there is no loss by evaporation, the finished product will represent 40.8 per cent. of oil, or about 36.7 per cent. of fatty acids. The author has examined two commercial samples. The first, a soap of German manufacture, appeared to be of satisfactory quality. It was a transparent, yellowish-brown, unctuous mass, of soap-like odor, perfectly soluble in distilled water, and, with the exception of a small residue, also in alcohol. Its analysis, the details of which are briefly given, gave the following results: Fatty acids, including resin insoluble in water, 41.5 and 41.8 per cent. (ten estimations); excess of alkali as KOH, 0.25 per cent.; hydrochloric acid as alkali chloride, 0.673 per cent.; sulphuric acid as alkali sulphate, 2.46 per cent.; glycerin, 3.97 per cent.; alcohol, none. Sodium was present in appreciable quantity, but the per cent. was not estimated.

The second sample was of American manufacture and claimed to be made from cotton-seed oil. It was much lighter in color than the first sample, transparent, soluble in water, and left a slight residue on treatment with alcohol. Its consistency, however, was too firm. Its analysis gave the following results: Fatty acids, insoluble in water, 48.7 per cent; excess of alkali—regarded as KOH, but almost entirely present as carbonate—1.16 and 1.14 per cent. (two estimations). From an examination of the fatty acids the author is satisfied that, as claimed, the soap was made from cotton-seed oil; and on adding sufficient water to reduce the amount of fatty acid in the mass to 40 per cent., a soap of a suitable consistence resulted.

The author expresses the opinion that a soft soap can be prepared without the use of excess of alkali if, as in the improved process recently patented in England by E. G. Scott (Jour. Soc. Chem. Ind. 1897, 811), the oil is first separated into glycerin and fatty acids by means of superheated steam and the latter are then saponified. A good soft soap should be perfectly soluble in water and should not contain more than 3 per cent. of matter insoluble in alcohol (carbonate, sulphate, silica, &c). It should not contain unsaponified fat, but should contain about one-fourth of one per cent. of free alkali. It should be transparent, of good consistence, not stringy; should contain about 40 per cent. of fatty acids insoluble in water, and should, of course, be free from adulterants, such as alkali, silicates, starch, etc. Finally, as soft soap loses moisture on exposure, which changes its physical properties, it should be stored in well closed containers and in a comparatively cool place. — Pharm. Review, Jan., 1898, 15-20.

Savonal—A New Medicinal Soap.—Muller and Graube prepare a pure soft soap, which they have named "savonal," as follows: Pure olive oil is first saponified in the cold by agitation with alcoholic potash solution; a portion of the clear alkaline solution which results is removed, cooled by means of ice, and the fatty acids precipitated from it by the cautious addition of hydrochloric acid. The precipitate is collected and again returned to the original alkaline alcoholic solution until perfect neutrality is reached. The alcohol is evaporated off, leaving the savonal in an unctuous condition. Liquid savonal is prepared by adding a few per cent. of glycerin to the soap, and sufficient water to bring the specific gravity to 1.050-1.055. This serves as a basis for many combinations, such as with salol, 5 to 10 per cent.; phenol, 5 per cent.; cresol, 0.25 to 2 per cent.; sozoiodol, naphthol, sublimate, iodoform, and many others.—Pharm. Jour., Sept. 18, 1897, 274; from Dermatol. Zeitschr.

Mercurial Soap—Preparation. — Under the name "Sapo Hydrargyri cinereus," Unna has introduced a substitute for mercurial ointment in dermatological practice. It is prepared with a superfatted soap obtained by the action of potassium hydrate solution upon lard, to which 5 per cent. of benzoinated lard has been added, and contains one third of its weight of metallic mercury. The same soap-base may be employed for making zinc paste and similar compounds or medicinal agents used for dermatological purposes.—Pharm. Ztg., Feb. 12, 1898, 105; from Monatsh. f. pr. Derm., 1898, 98.

Antiseptic Soaps—Value of Different Kinds.—Dr. Curzio has experimented with different antiseptic soaps on *Bacillus pyrogenes*. He finds that neither *1 per cent. sublimate soft soap nor hard soap* has either aseptic or antiseptic effect after twenty-four hours' contact with the micro-organisms, and that *10 per cent. carbolic soap* has no antiseptic action whatever. On the other hand, *salicylic acid soap*, 3 per cent., and *boric acid soap*, 5 per cent., are aseptic and antiseptic, the salicylic acid soap being the most powerful, arresting the development of the micro-organisms after a few minutes' contact.—Pharm. Jour., Feb. 26, 1898, 186; from La Semaine Medicale.

Disinfectant Soaps—Comparative Value of Various Kinds.—S. Rideal in a lengthy paper discusses the character and usefulness of the different disinfectant soaps that have been recommended. Many of these have little, if any, greater germicidal action than good curd soap, while the superfatted soaps, recommended by Dr. Unna, however serviceable they may be on account of their emollient properties for toilet purposes, are totally unsuited for the exhibition of disinfectants, the presence of free oils or fats being inimical to antiseptic action. In his opinion olein soaps are preferable as bases for disinfectant soaps to those containing palmitin or stearic acids.—Trans. Brit. Phar. Con. (Year-book of Phar.), 1897, 430–438.

Carbolic Acid Soap—Assay of Phenol.—Klopine recommends the following method for the assay of phenol in carbolic soap: Ten grammes of the shaved soap are introduced into a capacious flask with a few fragments of pumice stone and 200 Cc. of 5 per cent. sulphuric acid. This flask is connected on one hand with another flask, which serves as a steam generator, and on the other hand, with a condenser attached to a receiver. Steam is then blown through the boiling soap solution, and carries over the phenol. Distillation is continued until 100 Cc. of distillate are obtained, which is then thoroughly cooled, filtered, neutralized with soda, and extracted with ether until no reaction is given by the aqueous solution with ferric chloride. The ether is then evaporated and the phenol either weighed or determined volumetrically.—Pharm. Jour., March 12, 1898, 263; from Jour. de Pharm. [6], vi., 165.

Ichthyol-Salicylic Soap—Formula for the Treatment of the Hair.—Unna recommends for the treatment of the hair a soap containing: Ichthyol, 10 parts; salicylic acid, 5 parts; soap basis, 85 parts.—Pharm. Centralh., 1897, 840.

Liquid Tar Soap—Formula.—The following formula for a liquid preparation of coal-tar and soap is given by Roderfeld: Digest 300 Gm. of soft soap, 200 Gm. of glycerin, and 50 Gm. of liquor carbonis detergens on the water-bath to evaporate the alcohol from the latter, add 60 drops of oil of mellissa and 30 drops of oil of geranium when cold, and, after setting aside for some time, filter through a hot-water funnel.—Pharm. Centralh., 1897, 543.

SPIRITUS.

Spirit of Nitrous Ether—Prevention of Green Color when prescribed with Antipyrine.—Charles Caspari, Jr., calls attention to the green color that is produced in mixture containing spirit of nitrous ether and antipyrine. This green color is due to the formation of isonitroso antipyrine, $C_{11}H_{11}(NO)N_2O$, and can only occur in the presence of *free* nitrous acid. Commercial spirit of nitrous ether is almost invariably acid in reaction, or soon becomes so in aqueous solution, when, in the presence of antipyrine, the green color is sure to develop. To prevent this, an excess of alkali should be added to the mixture, and it would therefore be well if physicians who wish to prescribe the two substances together in a mixture, and wish to prevent the formation of the unsightly color, will add to their prescription some potassium or sodium bicarbonate.—Pharm. Review., Jan., 1898, 12.

STILI.

Antiseptic Crayons—Formula.—L. Adrian offers the following formula for preparing antiseptic crayons: Corrosive sublimate, 0.5; powd. talc., 25.0: gum tragacanth, 1.5; dist. water, glycerin, of each sufficient to make 10 crayons. The formula is a typical one, and the corrosive sublimate may be replaced by other antiseptics, such as boric acid, iodoform, phenol, salol, iodol, ichthyol, etc. To make astringent and antiseptic crayons, tannin, alum, antipyrine, ergotine, or ferric chloride are used; while resolvent crayons are made with potassium iodide, and sedative crayons with belladonna, morphine, cocaine, etc.—Amer. Jour. Pharm., Nov., 1897, 609; from Nouv. Rem., *13*, 483.

Croton Oil Salve Pencil—Formula.—Unna recommends a salve pencil of the following composition for use in the treatment of the hair: Croton oil, 10 parts; lanolin, yellow wax, of each 5 parts.—Pharm. Centralh., 1897, 840.

Yellow Oxide of Mercury Pencils—Preparation for Use in Ophthalmic Practice.—Dr. Babcock calls attention to an old formula for preparing pencils for ophthalmic use, which, although containing some unusual ingredients, is found in practice to be very serviceable. English graphite, 10 grains; yellow oxide of mercury, 20 to 40 grains; oil of theobroma, 4 drachms; butter of antimony, 2 drops. Mix and mold into pencils. Instead of the butter of antimony any bland oil will do. In applying the stick to the lids, it is rubbed on the eyelids, and the eyes closed for about ten seconds, when any excess is wiped off. If it is to be introduced into the eye, a small piece is picked off, softened between the fingers, and put between the ball and the lower lid, or the upper lid is everted and dressed with the pencil. It is also a good application for any abrasion of the lips or nostrils.—Phar. Jour., March 5, 1898, 230; from Quart. Med. Journ., vi., 179.

Stili Resinosi—Preparation and Use for the Removal of Hairs.—Unna recommends pencils made from resin, to which 10 per cent. of yellow wax has been added, for the removal of hairs. The pencils are applied by warming the end to the melting point (about 60°), pressing it lightly upon the spot from which the hairs are to be removed, allowing it to cool, and then pulling out the hairs with quick jerk. The pain caused by removing several hairs in this manner is said to be no greater than when a single hair is extracted by means of an epilation forceps.—Pharm. Review, May 1898,199; from Monatsh. f. prakt. Derm., 1898, i.

SUCCI.

Lemon Juice—Composition.—Prof. A. Borntraeger ascertained the composition of the juice of ripe and of unripe lemons to be as follows:

	From Ripe Fruit.	From Unripe Fruit.
Citric acid, by acidimetric determination	7.25 per cent.	7.70 per cent.
Citric acid, by precipitation with lime	7.28 "	7.52 "
Tartaric acid	none	none
Reducing sugar	0.75 "	0.21 "
Saccharose	0.19 "	0.78 "
Ash	0.384 "	0.486 "
Total extract	8.87 "	9.30 "
Extract, less citric acid and sugars	0.68 "	0.61 "
Rotation	+0.7	+1.13

—Pharm. Centralh., April 21, 1898, 282.

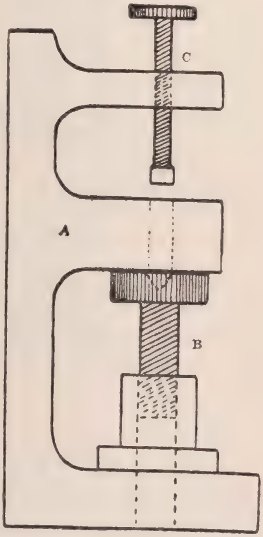
Lime Juice — Clarification and Preservation.—According to "Miss. Water Trade Review," there are two methods in use for efficiently clarifying lime juice, which differ only in that, in the one case, the lime juice is treated directly after expression from the fruit, while in the other—the preferable one—the juice is treated, as follows: The juice is heated to a temperature not below 150° F., nor above 160° F., and while still hot is filtered through any filtering medium that is convenient; but crushed quartz, graded and arranged in the filtering vessel in such a way that the larger pieces are at the bottom of the vessel, while the smaller fragments are on top, is recommended. If this process is performed shortly after the harvesting of the fruit, the juice will, under ordinary conditions, keep good for twelve months. But if the juice is intended for exportation, then it may be prevented from decomposing, and rendered fit for transit, by mixing it with one-tenth of proof spirit, as recommended by Schweitzer. When ready for the market, the specific gravity should be 1044, the percentage of citric acid should attain 8.66, and that of the ash obtained by evaporation and incineration, 0.401.—Pharm. Era, May 12, 1898, 698.

SUPPOSITORIA.

Suppositories—Conditions Necessary to their Preparation.—Edmund White and J. Oldham Braithwaite communicate an excellent paper on suppositories in which the following points are considered in great detail: 1. Suppository moulds. 2. Examination of suppositories derived from various sources, together with methods of analysis. 3. Observations on oil of theobroma (which see under "Organic Chemistry." 4. Method of manufacture. 5. Suggestions for improvement. For much of what is said under these several headings reference must be had to the original paper, though the general drift may be outlined from what the authors say under the heading of "Suggestions of improvements." After considering the subject in its various aspects and in relation to the results of their work, it seems that the existing methods which depend upon moulds having a fixed capacity can not realize the conditions for desired accuracy under varied conditions described by them. What is required is a mould whose capacity may be varied within certain limits so as to render one able to deal with the varying volume of basis and medicament. They have produced a mould which realizes the required conditions, but being the first one made by them, it is open to some mechanical alterations to facilitate the manipulation without altering the principle of construction. The principle involved is the compression in compact form of a weighed quantity of material. Having had but little opportunity of practical work with this mould, however, they propose deferring any further statements regarding it, only observing that excellent suppositories, each containing ten grains of chloral hydrate, have been made by this machine, thus showing that the mould has capabilities not possessed by the form ordinarily used.—Pharm. Jour., Nov. 20, 1897, 437–441.

The suppository mould referred to in the above paper is shown in the accompanying cut (Fig. 63). The mould is formed by a cylindrical hole drilled through the middle limb of the frame, *A*, and a conical cavity drilled in the top of the screw, *B*. In using the mould the screw, *B*, is raised until its upper surface is pressed firmly against the lower surface of the middle limb of the frame. The material to be moulded is then introduced into the cavity in *A*, and the pressure applied by means of the screw, *C*, which carries a plunger accurately fitting this cavity. After applying the necessary pressure the screw, *B*, is lowered and the moulded material expelled by further depression of the screw, *C*. The design is provisionally protected, and the apparatus will probably soon be placed on the market.—Ibid., Jan. 15, 1898, 62.

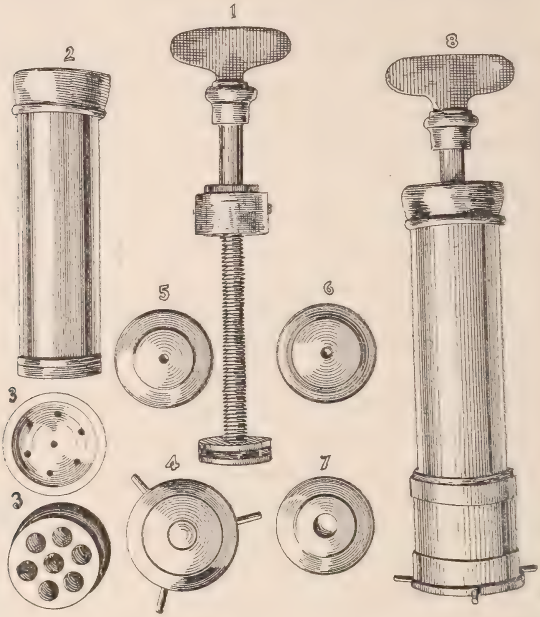
FIG. 63.



Mould.

Suppositories—A Simple Mould.—H. P. Hearder has devised a mould for suppositories, bougies, pessaries, etc., which is constructed on the principle of the syringe, in which the piston-rod is screwed in and out instead of simply sliding. The accompanying illustration (Fig. 64), admirably shows the method of its use. The suppository mass, made by triturating theobroma oil with the medicinal ingredients in the well-known manner, is introduced in the mould (8) in fairly small pieces. The piston (1) being withdrawn, the cylinder (2) is filled with the mass, which is pressed down with the piston-rod from time to time so that fresh portions may be added until the mould is compactly filled. The piston is then secured in its place by means of the bayonet-catch attached to the cap through which the piston screws—the actual moulds (3, 3) and the cap (4) having been in place during the entire operation up to this point. Pressure being now applied by screwing down the piston, the mass is forced through the small hole shown in the upper drawing (3) into the mould proper, shown in the lower drawing (3); the pressure being continued until a firm resistance is felt. The cap (4) is then removed, when the suppositories may be ejected by simply giving an extra turn to the screw, when they may be readily disconnected from the fine thread that connects them with the mass by a short twist. For pessaries and bougies the moulds (3) and cap (4) are replaced by one of the other caps, shown at 5, 6 and 7. The cylinder will hold sufficient material to make about four dozen 15-grain suppositories, but as few as six can be made at a time.—Pharm. Jour., March 19, 1898, 281.

FIG. 64.



Simple Mould.

Suppositories—Advantageous Use of a "Shaper."—Geo. E. Barksdale, after making the suppository mass by incorporating the medicinal ingredients with cacao butter in a mortar—warmed if needed—until a uniform mass of a pilular consistence is obtained, rolls it out into a cylinder of suitable length and then divides the cylinder into as many portions of equal length as may be necessary, each portion to make two suppositories. This is then rolled out into a double suppository, conical at either end, and to be subsequently cut in two at its center, using for this purpose a simple contrivance which he calls a shaper. This shaper consists of two blocks of wood, hollowed out to the shape of a double cone, which are worked to and fro upon each other to effect the desired end. In this way he finds it possible to make eight suppositories in about ten minutes, which are perfectly smooth and regular in shape.—Proc. Virginia Pharm. Association, 1897, 64.

Suppositories, Pessaries, etc.—Practical Hints Concerning their Preparation.—Delaye makes some practical observations on the preparation of suppositories, pessaries and gynecological crayons, for all of which he prefers a basis of gelatin and glycerin, without previously softening the former with water, since he finds that, on keeping, the preparations made with water-softened gelatin lose their shape and consistence. For

Gelatin Suppositories he recommends the use of five bases, containing respectively 10, 8, 7, 6 and 5 parts by weight of sheet gelatin in 90, 92, 93, 94 and 95 parts of glycerin. The gelatin is simply dissolved in the glycerin by heating on the water-bath. The melted basis is mixed intimately with the medicament; when six pessaries are ordered, the requisite quantities for seven are weighed out, and the pessaries are left in the mould for at least twelve hours. When removed they are slightly oiled with olive oil or paraffin. For general use the mass containing 7 per cent. of gelatin is preferable for bodies which are soluble in glycerin and first dissolved in a portion of the solvent which is used to complete the weight. The basis containing 8 per cent. of gelatin is used for vegetable extracts and liquids, such as ichthyol, creolin, etc. The 10 per cent. basis is reserved for hygroscopic substances, such as potassium iodide, chloral, etc. In certain cases the irritant action of glycerin on the rectum contraindicates its use for suppositories. When this is so, a mass containing 25 to 30 parts of gelatin and 75 to 70 parts of water may be employed. Where no objection to the use of glycerin occurs, the suppository basis may be composed of similar proportions of gelatin and that solvent to those stated above, the basis, containing 30 per cent. of gelatin, being reserved for liquid or soft medicaments. These suppositories melt between 32° and 34° C. For

Cacao Butter Suppositories, he recommends the addition of 12½ per cent. of white wax, since theobroma oil alone melts too rapidly in the bowels.

Gynecological Crayons are best prepared with the following basis: Sheet gelatin, 2; distilled water, 2; simple syrup (containing sugar, 5; water, 1), 1 part. The medicament is first dissolved or suspended in the water. The mass thus obtained cannot be poured out, but must be shaped while warm by introducing between the open halves of the mould and closing with pressure. When cold, the superfluous mass is trimmed off with a pair of scissors and dried by exposure to the air for two or three days in a dry place, and finally coated with a solution of gelatin, 20, in glycerin, 85.—Pharm. Jour., May 21, 1898, 504b; from Journal de Pharm. d'Anvers, liii., 255.

Gelatin Suppositories—Formulas for the Mass.—In reply to a query of the Wisconsin Pharmaceutical Association, L. A. Le Mieux makes some general remarks upon the preparation and use of gelatin suppositories, which he personally does not favor, and communicates the following formulas for making the mass, which, he says, is prepared after the manner of making the mass for printer's rollers or copying pads.

Formula No. 1.—Gelatin, 40 parts; glycerin, 25 parts, water, 200 parts. To make 100 parts.

Formula No. 2.—Gelatin, 40 parts; glycerin, 25 parts; acacia, 25 parts; water, 200 parts. To make 100 parts.

Formula No. 3.—Gelatin, 40 parts; glycerin, 26 parts; acacia, 20 parts; tannin, 5 parts; water, 200 parts. To make 100 parts.

Place the gelatin, cut in small pieces, into a suitable vessel, add the other ingredients, and heat on a water-bath, while stirring, until the gelatin is completely dissolved and free from lumps; continue the heat until the mass is evaporated to one hundred parts. Brisk stirring and boiling must be avoided, especially as evaporation approaches completion, otherwise the mass on cooling becomes interspersed with small holes due to either or both of these causes. In this event, it must be remelted with 100 parts of water, and again evaporated to the required weight. If moulds are used to form them they should be oiled before pouring the melted mass into them, and if the moulds are of metal they may be heated to 50° C. before filling. Formula No. 1 is well adapted to medication. No. 2 is a good summer mass, and suitable for warm or moist atmospheres. No. 3 is given for what it is worth, such a mass being favored by some, but not by the author.—Proc. Wisc. Pharm. Assoc., 1897, 60–65.

Glycerin Suppositories—Convenient Mass.—Rauanne recommends the following formula and method for making a glycerin-gelatin mass, which may be kept for the convenient preparation of suppositories. Twenty-four grammes of particularly hard and pure gelatin are soaked in cold water for two hours, then heated over an open fire to 45° or 50°, and 176 grammes of glycerin are stirred into the mixture. This is strained into a shallow vessel, so that a large surface may be exposed, and it is allowed to stand either in the air or a drying closet until all the water has evaporated. It may then be cut into strips and preserved in vessels tied over with linen. The mass contains 12 per cent. of gelatin, and may be combined with any desired medicament by mixing a glycerin solution of the latter with the proper quantity of the previously melted glycerin-gelatin. Then, to make *tannin* suppositories, the proportions of glycerin solution of tannin and of glycerin-gelatin are so adjusted as to make the suppository contain 6 per cent. of gelatin, while *alum* suppositories are so adjusted that the finished suppository mass contains 8 per cent. of gelatin. It is advisable to use an abundance of the material, so that its quantity may not be deficient when moulding the suppositories.—Pharm. Centralh., July 1, 1897, 425; from Univers. Pharm.

Cereoli (Bougies)—Semi-Official Formulas.—In the new supplement (1897) to the third edition of the German Pharmacopœia, bougies are designated by the new term "cereoli."

Tannin Bougies are made by heating equal parts of tannin and boric acid into a mass with mucilage, glycerin and water, and forming this into bougies. An elastic tannin bougie is obtained by combining the tannin with gelatin-glycerin mass.

Iodoform Bougies consist of 10 parts of iodoform, 9 parts of cocoa butter, and 1 part of almond oil. A stronger suppository may be made by massing 92 parts of iodoform with 5 parts of powdered gum and equal quantities of glycerin and water, while elastic iodoform bougies may be made with gelatin-glycerin mass, so as to contain 10 per cent. of the medicament.—Pharm. Jour., Oct. 23, 1897, 359–360.

Agar-Agar Suppositories—Objections.—Buchtwilz states that when agar-agar suppositories are kept in the air they become dry and hard, and, therefore, useless, while when kept in air tight vessels they become covered with milldew after several weeks. Tests made show that the agar-agar jelly made in proportion of 1 : 29, does not liquefy at the heat of the body. To make a uniform solution in these proportions, heat under pressure is necessary. A further disadvantage arises from the fact that the adhering portions on the sides of the vessel in which the jelly is melted cannot be brought into calculation, and absolutely exact medication is, therefore, impossible. In practice it is furthermore found that the brittleness of the finished suppository makes it difficult to introduce.—Pharm. Wochen., xv., 263.

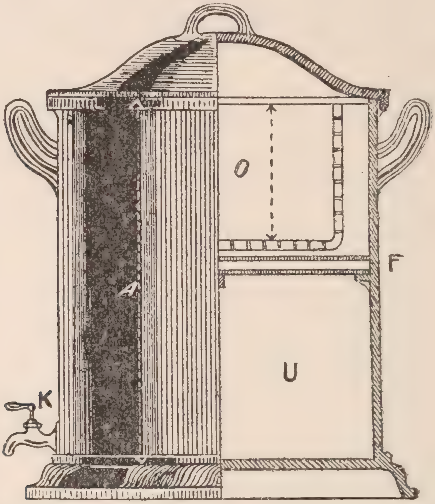
Ichthyol Suppositories—Proper Addition of Wax.—Eschenburg states that the melting point of oil of theobroma and wax mixtures is considerably lowered by the addition of ichthyol, and in proportion to such addition. Thus, a mixture of 3 parts of oil of theobroma, 0.2 parts of white wax, and 1 part of ichthyol, melts at 36° C., while a mixture of 2 parts of oil of theobroma, 0.05 part of white wax, and 0.5 part of ichthyol, melts at 33° to 34° C. It is best to add the ichthyol just as the base begins to congeal.—Pharm. Centralh., 1898, 7.

Anusol Suppositories—A Remedy for Hæmorrhoids.—According to "Pharm. Centralh," anusol (*iodine-resorcin-bismuth-sulphate*) has given good results in the treatment of hæmorrhoids in the form of suppositories, for which the following formula is given: Anusol, 7.5 Gm.; zinc oxide, 6.0 Gm.; Peruvian balsam, 1.5 Gm.; cacao butter, 19.0 Gm.; cerate, 2.5 Gm. To be made into 12 suppositories.—Pharm. Centralh., *38*, 242.

SYRUPI.

Syrup—Automatic Percolator.—Kopp has devised the automatic syrup percolator (shown by Fig. 64), which is intended for the convenient and economical production of syrup in large quantities. It may be constructed of any convenient size, either of tin or other suitable material. It consists of a cylindrical vessel divided at *F* by a diaphragm for the reception of the filling medium. Sugar being introduced into the perforated vessel *O*, water is introduced into the compartment below, *U*, until it touches the sugar, when by circulating solution the syrup begins to form until the requisite density is reached, when it may be drawn off at *K*.—West. Drugg., Nov., 1897, 517.

FIG. 64.



Syrup—Preparation for the Soda Fountain.—C. A. Cook makes some practical suggestions concerning the making of syrup for the soda fountain. A large wash-tub is provided with a faucet as near the bottom as practicable. Sugar and distilled water, in proportion of 10 lbs to the gallon, are placed into the tub, and, being stirred briskly with a ladle, solution is effected in a short time. Then, having added formaldehyde in the proportion of 10 drops to each gallon, the syrup is allowed to run from the faucet into a 10-gallon keg through a straining funnel. So prepared, the syrup will keep perfect for a long time.—Merck's Rep., Oct. 1, 1897, 599.

Leon L. Watters also describes a convenient arrangement for the preparation of syrups by percolation for the soda fountain. It consists essentially of a large tinned iron percolator, the mouth of which enters the bung of a barrel placed beneath. General directions are given, together with an outline drawing of the apparatus, which may be consulted in Amer. Drug., June 25, 1898, 340.

Syrups—Preservation by Means of Glycerin.—Schmatolla recommends for the preservation of syrups and similar easily-fermentable substances—such as extract of licorice—filling them into bottles well up to the neck and carefully pouring on the surface a little glycerin; then inserting the stopper, which may be a plug of sterilized cotton as well as either cork or glass.—Apoth. Ztg., 1897, 598.

Rock-Candy Syrup—Claims of Superiority.—In an anonymous communication (Drugg. Circ., Aug., 1897, 216), the claim is brought forward that rock-candy syrup is not alone fully equal, but superior to any syrup that can be made direct from sugar, for the following reasons: The manufacturer of rock-candy syrup begins his process with sugar which tests 100 per cent. of saccharine (*sic*), and is, therefore, free from adulterations in the form of coloring or other matter. This sugar is specially refined for the condensed milk manufacturers and the makers of rock candy, and is not sold elsewhere. The resulting syrup is made by dissolving the sugar in pure filtered water, at a temperature not exceeding about 112°, the solution being constantly stirred by mechanical means until it is reduced to the proper consistence. At no time is the degree of heat sufficient to produce invert sugar, and the process of crystallization could, therefore, be carried on until every particle of the solution had been crystallized. But at whatever point crystallization ceases, the remaining solution can be nothing but pure. Whether the syrup sold by the makers of rock candy was originally a by-product or not, the author of the paper quoted cannot say; but he states that for years past, the characteristics of syrup made from rock candy have gained such wide recognition as being the superior of syrups made direct from sugar, that the candy is now a by-product, and before it is ground for reconverting into syrups, it can be purchased from the manufacturer at the price of refined sugar. Rock-candy syrup, aside from its peculiar rich flavor, is characterized by a density considerably greater than that of sugar syrups, and there is never any variation in this density, which is 36° B. at 60° F.

Syrups—Practical Observations.—John K. Williams, speaking of the process of percolation for preparing syrups, expresses regret that the Pharmacopœia should make this secondary to that of "shaking up unti dissolved," and that an essential direction was omitted, viz., that as the fluid begins to drop, the orifice should be closed for twelve hours, allowing the sugar to melt somewhat before permitting the syrup to flow. Instead of a plug of sponge "pressed down into the neck of the percolator," he found a grooved cork placed in the neck and covered by a thin, broad piece of fine sponge, with a nipple-shaped projection—double the thickness of the rest—in the center, to rest on the cork and serving as a diaphragm, to give the most satisfactory results.

Syrupus Senegæ is best made by a modification of R. Rother's suggestion for making syrup of ipecac. Take of senega, 10 troy ounces; stronger ammonia water, 3 fluid drachms; alcohol, 4 fluid ounces; water, 20 fluid ounces. Macerate in a closed vessel for three days, express and strain. Remacerate the dregs in a mixture of stronger ammonia water, 1 fluid drachm; alcohol, 4 fluid ounces; water, 16 fluid ounces; express and strain as before. Mix the liquors, add one ounce of precipitated chalk, filter, and pass enough water through the filter to make 25 fluid ounces. Percolate this through 38 troy ounces of sugar and make up to 48 fluid ounces. In the same way

Syrupus Scillæ Compositus may be prepared as follows: Take of squill and senega, each 10 troy ounces; stronger ammonia, 3 fluid drachms; alcohol, 3 fluid ounces; water, 40 fluid ounces. Macerate in a closed vessel for three days, express, and strain; return the dregs, and remacerate with stronger ammonia 1 drachm; alcohol, 8 fluid ounces; water, 40 fluid ounces; express, and strain; mix the decantates, and shake with two ounces of precipitated chalk; filter; percolate through sugar 100 troy ounces, to make about 8 pints or 168 troy ounces. Add antimonium and potassium tartrate, 2 drachms, dissolved in boiling water, 1 fluid ounce.—Bull. Pharm., Sept., 1897, 406; from Proc. Conn. Pharm. Assoc., 1897.

Syrups—Improved Formulas.—Dr. A. R. L. Dohme, in a report to the Maryland Pharmaceutical Association, recommends the following formulas for endorsement or criticism:

Syrup of Iodide of Iron: Iodine, 83 Gm.; iron, 25 Gm.; solution of hypophosphorous acid, 50 per cent., 5 Cc.; sugar, 850 Gm.; distilled water, sufficient. Make the solution of ferrous iodide as usual, dissolving 50 Gm. of sugar in it before filtering, and while yet in contact with iron. Filter the solution into a bottle containing the remainder of the sugar, and wash the filter with sufficient water to make the syrup measure when finished 1000 Cc., dissolving the sugar by aid of gentle heat, straining, and adding the solution of hypophosphorus acid last.

Syrup of Tar: Alcoholic solution of tar (which see under "Liquores"), 50 Cc.; magnesium carbonate, 10 Gm.; granulated sugar, 850 Gm.; water, sufficient. Rub the tar solution first with the magnesium carbonate and 50 Gm. of sugar, then with 400 Cc. of water, gradually added. Allow the mixture to stand several hours, agitating occasionally; then filter, dissolve the remainder of the sugar in the filtrate by gentle heat, strain the syrup through flannel, and add sufficient water to make the whole measure 1000 Cc.—Proc. Maryland Pharm. Assoc., 1897, 40.

Syrup of Ferrous Iodide—Preservation by the Addition of Glucose.—F. R. Macy, having noticed a query list of the American Pharmaceutical Association on the preservative effect of glucose on syrup of ferrous iodide, has made a number of careful experiments which demonstrate, to his satisfaction, that syrup of ferrous iodide may be kept unchanged by the substitution of 20 to 25 per cent. of glucose for the syrup ordered in the U. S. P. He mentions, however, that he has never found any difficulty with the U. S. P. syrup, if properly made. It is not necessary to add glucose or any other preservative to this syrup in order to keep it in perfect condition. All that is necessary is to keep the syrup in the full sunlight. On the other hand, the process of the B. P. will not yield a satisfactory product.—Can. Pharm. Jour., Sept., 1897, 77.

Syrup of Iodide of Iron—Addition of More Sugar.—Geo. E. Barksdale believes that the keeping qualities of syrup of ferrous iodide will be improved by the addition of sugar sufficient to convert the added solution of ferrous iodide into syrup of equal sugar content as the syrup to which it is officially directed to be added. For this purpose the solution is filtered into the greater part of the required syrup, as usual, 148 Gm. of sugar are added, and enough syrup to make 1000 Gm.—Proc. Virginia Phar. Asso., 1897, 64.

Syrup of Hydriodic Acid, U. S. P.—Permanence Secured by the Addition of Glycerin.—Harry B. Mason discusses the difficulties encountered in securing a permanent syrup of hydriodic acid by the official formula, and states that he has had no trouble in making a reasonably stable syrup when he added to the solution of tartaric acid, prepared in the quantity and proportions of the U. S. P., an ounce of glycerin before mixing it with the solution of the potassium salts. The function of the glycerin appears to be that it prevents for a reasonable time the decomposition of the hydriodic acid and the consequent liberation of iodine.—Merck's Rep., Nov. 15, 1898, 693.

Syrupus Ferri, Quininæ et Strychninæ Phosphatum (*Easton's Syrup*)—*Improved Formula.*—R. Brodie, after critically revising the numerous improvements proposed for the preparation of "Easton's Syrup" since its introduction into the B. P. (1867), proposes the following improved formula for the production of a perfectly bright syrup which has proven satisfactory during a period of several years.

Take of—

Iron Wire free from rust	90 grains.
Phosphoric Acid, (sp. gr. 1.52)	2 fl. oz.
Hypophosphorous Acid	1 drachm.
Strychnine, in crystals	6 grains.
Hydrochloride of Quinine	120 grains.
Sugar	16 ounces.
Distilled water, sufficient quantity to produce	24 fluid ounces.

Put the acids into a flask and dilute with two ounces of the water, introduce the iron wire previously cut up into inch lengths, plug the neck of the flask with cotton wool and set aside, allowing the action to proceed without the application of heat. Dissolve the strychnine by means of a very gentle heat in an ounce of water to which has been added an additional drachm of phosphoric acid; after the strychnine is dissolved, add the hydrochloride of quinine. Filter both solutions into the syrup previously prepared by dissolving the 16 ounces of sugar in 8 ounces of water by means of heat, but care must be taken that the solutions as well as the syrup be thoroughly cooled before being mixed.

The replacement of quinine phosphate by the hydrochloride the author considers unobjectionable, while the difference in apparent quantity is less than half a grain per ounce.—Trans. Brit. Pharm. (Yearbook of Pharm.), 1897, 395–398.

Sprupus Aurantii—Improved Process.—Ed. E. Williams recommends the following process as being an improvement on the U. S. P. process for preparing syrup of orange: Take of sweet orange peel from fresh fruit—50 Gm.; pumice, in lumps, 100 Gm.; precipitated calcium phosphate, 50 Gm.; sugar, 700 Gm.; alcohol, water, of each sufficient to make 1000 Cc. Place the pumice in a wedgewood mortar, of suitable capacity, and reduce it to a very coarse powder. Then add the orange peel and triturate the mixture until it forms a powder of a uniform yellow color. Transfer to a narrow percolator, without pressure, and percolate with hot alcohol until 100 Cc. of percolate are obtained. Pour this percolate upon the calcium phosphate, and 150 Gm. of the sugar, contained in a suitable bottle, and add, in divided portions, 300 Cc. of water, agitating after each addition. Filter throngh a wetted double filter, returning the first portions of the filtrate, if necessary, until clear. In the filtrate dissolve the remainder of the sugar by agitation, strain and add enough water, passed through the filter and strainer, to make the product measure 1000 cubic centimeters. —Amer. Drugg., March 10, 1898, 125.

Syrup of Raspberry—Improved Method of Preparation.—W. Noerr recommends a method for preparing raspberry syrup which is in some details different from that usually employed. To the expressed juice of fresh raspberries 2 per cent. of sugar is added, and it is then allowed to stand in a cellar for four or five days, or until a filtered sample will remain clear on addition of alcohol. The juice is then strained, heated to boiling, and, after removal from the fire, the white of one egg is added for each four liters of juice, whereupon it is filled direct into previously warmed wine bottles, and allowed to settle for one day. It is then filtered, and may be at once converted into syrup, or it may be preserved as juice in bottles, which must be sterilized in a steam-bath and hermetically closed with paraffin. These operations are to be conducted in the cellar, which is particularly adapted for the slow and regular process of fermentation, as well as for the subsequent subsidence and filtration of the juice. Color and aroma remain unimpaired for years.—Pharm. Post, Oct. 24, 1897, 534.

Pleasant Laxative Syrups—Various Formulas.—In response to a query of a Committee of the Missouri Pharmaceutical Association, several formulas were suggested by different members at the meeting in 1897. G. H. Chas. Klie suggests the following, which, to judge from the heading, forms so pleasant a laxative that "babies cry for it."

Ginger, cinnamon bark, coriander, caraway, fennel, of each 2 drachms;

orange peel, 6 drachms; podophyllum, anise, of each 1 ounce Troy; Alexandria senna, 12 ounces Troy; tartaric acid, 1 ounce Troy. All the ingredients, except the tartaric acid, are ground for percolation, and a fluid extract is prepared by re-percolation with twenty-five per cent. alcohol as menstruum. The tartaric acid is added to the pint of fluid extract obtained, the mixture is shaken frequently during three or four days, then allowed to stand one week, then filtered and mixed with 3 pints of simple syrup.

To make an ideal preparation, however, in which the resinous principles of the senna are completely eliminated, the author suggests the removal of the alcohol from the fluid extract by distillation, restoring its volume with water, treating with tartaric acid as before, and filtering. To the filtrate 2 fluid ounces of alcohol (or 3 fluid ounces of the distillate) are added, and enough simple syrup to make four pints in all.

A third formula is suggested for its more convenient preparation from essential oils, tincture and fluid extract. It is as follows: Oil of cinnamon, oil of coriander, oil of caraway, oil of fennel, of each 2 minims; oil of orange, oil of anise, of each 10 minims; tincture of ginger, tincture of podophyllum, of each ½ fluid ounce; water, 2½ fluid ounces; fluid extract of senna, 12 fluid ounces; tartaric acid, 1 ounce. The oils being dissolved in the tincture of ginger, the tincture of podophyllum and the fluid extract are added, mixed well, and then shaken with the tartaric acid dissolved in the water, and treated as in the process first mentioned. The filtrate, which should measure 1 pint, is then mixed with 3 pints of simple syrup. This process also yields a preparation free from the resin if the alcohol is removed from the fluid extract of senna. The oils dissolved in the tinctures are added just before distillation is completed. Otherwise the process is the same as mentioned under the second process.

H. F. Hassebrock also contributes a formula which forms a mild and pleasant laxative for children, the dose being one or two teaspoonfuls: One ounce each of rhubarb and of Alexandria senna, and one-half ounce each of pumpkin seed, anise, chenopodium, coriander and hydrastis, are reduced to a No. 40 powder, moistened with a menstruum composed of glycerin one part, alcohol two parts, and water three parts, macerated during forty-eight hours, and percolated with the same menstruum until two pints are obtained. In this tincture one ounce of potassium bicarbonate, sixteen ounces of potassium and sodium tartrate, thirty-two ounces of sugar, and ten minims of oil of peppermint are dissolved, and, lastly, enough treacle is added to make four and one-half pints.

Still another formula is that of R. S. Vitt. It is as follows: To 125 Gm. of cut Alexandria senna, add 300 Cc. of boiling water, digest at not exceeding 60° C. during twenty-four hours. Express and pass enough water through the residue to obtain 250 Cc. of liquid, which is then strained. In the strained liquid dissolve 30 Gm. of sodium bicarbonate and 60 Gm. of potassium and sodium tartrate, add 10 Cc. of fluid extract of wormseed and 20 Cc. of fluid extract of pumpkin seed, and follow by the addition of a solution of 0.12 Cc. of oil of anise, 0.33 Cc. of oil of peppermint, and 0.66 Cc. of oil of wintergreen in 15 Cc. of alcohol. Set aside for two hours, pour off the clear liquid, filter the remainder, and pass enough water through the filter to obtain a total of 275 Cc. of clear liquid. In this dissolve, without heat, 350 Gm. of sugar, strain, and pass enough water through the strainer to make the product measure 500 Cc. Lastly, add 8 Cc. of liquor saccharini, N. F. The pleasantly odorous and tasting dark-brown preparation acts well, does not gripe, and may be given in doses of a half teaspoonful to one, two or three, every three or four hours, according to the age of the child and the exigency.—Proc. Mo. Pharm. Asso., 1897, pp. 63, 74 and 88.

Syrups—Various Desirable Formulas.—The "Cincinnati Academy of Pharmacy" publishes formulas for a number of syrups that are in popular demand, as follows:

Syrup of Albuminate of Iron: Ferric chloride, 10 Gm.; fresh egg albumen, 375 Cc.; sugar, 750 Gm.; distilled water, a sufficient quantity to make 1000 Cc. Dissolve the ferric chloride in 60 Cc. of water. Add this solution to the egg albumen previously mixed with 200 Cc. of water. Percolate this solution through the sugar and add sufficient water through the percolator to make 1000 Cc.

Syrup of Glycyrrhiza and Eriodictyon: Fluid extract of eriodictyon, 50 Cc., pure extract of glycyrrhiza (U. S. P.), 50 Gm.; magnesium carbonate, 20 Gm.; sugar, 600 Gm.; distilled water, a sufficient quantity to make 1000 Cc. Mix the fluid extract of eriodictyon with 100 Gms. of sugar and the magnesium carbonate in a mortar. Add gradually 200 Cc. of water. Filter and add sufficient water through the filter to make 400 Cc. of filtrate. Add the extract of glycyrrhiza, dissolved in 50 Cc. of water, the remainder of the sugar and heat to a boiling point; strain and add sufficient water to make 1,000 Cc. Keep the syrup in a cool, dark place. This syrup makes a pleasant and perfect vehicle for quinine.

Compound Syrup of Phospho-Muriate of Quinine: Potassium bicarbonate, 35 Gm.; magnesium carbonate, calcium carbonate, of each 20 Gm.; soluble ferric phosphate, 16 Gm.; quinine hydrochlor, 4 Gm.; strychnine, 0 14 Gm.; phosphoric acid (U. S. P., 85 per cent.), 40 Cc.; orange-flower water, 125 Cc.; syrup sufficient to make 1000 Cc. Dissolve the salts in a mixture of the phosphoric acid and orange-flower water. Add sufficient syrup to make 1000 Cc. To be made freshly when wanted for use. Each fluid drachm contains one-fourth grain of quinine muriate, $\frac{1}{120}$ grain of strychnine, 1 grain of iron phosphate and about 4 grains of the combined phosphates of potassium, magnesium and calcium.

Compound Syrup of Trifolium: Fluid extract of trifolium, 80 Cc.;

fluid extract of lappa, fluid extract of berberis aquifolium, fluid extract of cascara amarga, fluid extract of phytolacca, of each 40 Cc.; fluid extract of xanthoxylum, 10 Cc.; sugar, 650 Gm.; potassium iodide, 20 Gm.; distilled water, a sufficient quantity to make 1000 Cc. Mix the fluid extracts with sufficient water to make the whole measure 600 Cc. Allow to stand one hour, filter and percolate the sugar with the filtrate. Dissolve the potassium iodide in the syrup and add sufficient water to make 1000 Cc. Powerfully alterative.—Amer. Drugg., Mar. 10, 1898, 130.

Cough Syrups—Formulas.— Frank Edel communicates the following formulas for different expectorants and cough syrups, which have been found efficient both from a pharmaceutical and therapeutical standpoint:

White Pine Expectorant: White pine bark, ½ oz.; wild cherry bark, 1 oz.; balm of gilead buds, spikenard, blood-root, of each 64 grains; sassafras, ipecac, of each 32 grains. These should be ground for percolation, thoroughly mixed, and then moistened with a menstruum of 1 part of alcohol and 3 parts of water, and allowed to stand for several hours, then packed in a percolator and menstruum added, and allowed to macerate for twenty-four hours. Then percolate to 10 ounces, in which dissolve ½ ounce of ammonium chloride and 12 ounces of sugar, by cold percolation. Then add 1 drachm of chloroform and agitate thoroughly, and add 3 grains of morphine acetate dissolved in a small amount of water.

White Pine and Tar Expeetorant is prepared from the preceding by adding to 29 ozs. of it 2 ozs. of glycerite of tar and 1 oz. of syrup of ipecac.

Wild Cherry Balsam is made by the following formula: Wild cherry bark, licorice root, ipecac, of each 1 oz.; bloodroot, sassafras, of each 1 drachm; compound tincture of opium, 1 oz.; fld. ext. of cubeb, ½ oz. Moisten the ground drugs with the fluid extract and tincture and enough menstruum composed of 25 per cent. alcohol, and after six or eight hours pack in a percolator and pour on menstruum until percolation begins. Then cork the orifice and cover the percolator and allow to macerate for 24 hours. Then percolate to 10 ounces, pouring back the first portion of percolate until it comes through clear. In the percolate dissolve ½ ounce of ammonium chloride and ½ ounce of sugar by cold percolation, adding simple syrup, if necessary, to make 16 fluid ounces. Finally, add 1 drachm of chloroform.

Tolu, Tar and Wild Cherry: Tincture of tolu, 1 oz.; camphorated tincture of opium, 2 ozs.; fld. ext. of ipecac, 1 drachm; white pine bark, ½ oz.; wild cherry bark, 1 oz.; pine tar. 2 drachms. Mix the tar and ground drugs, adding pine saw-dust if necessary. Then add the tinctures and fluid extract. Pour in a percolator and pour on menstruum and let stand for twelve hours. Now percolate with 25 per cent. alcohol until 18 ounces of percolate have been received, in which dissolve one ounce of ammonium chloride and 22 ounces of sugar by cold percolation. Lastly add three ounces of glycerin.

Blood Root Expectorant: Fluid ext. of ipecac, 2 drachms; fluid ext. of cubeb, 1 oz.; fluid ext. of blood root, 2 drachms; camphorated tincture of opium, 2 ozs.; water, 4 ozs. Mix, add sufficient precipitated calcium phosphate, shake and filter clear; then add 4 ounces of glycerin and enough syrupy glucose to make the whole measure 32 ounces. Lastly add 2 drachms of chloroform and agitate well.—West. Drugg., Dec., 1897 557.

Syrup of Yerba Santa—Efficiency of the Resinous Constituents in Disguising the Bitterness of Quinine.—Thos. W. Murphy has observed that clear syrup of yerba santa is not efficient for disguising the bitterness of quinine, while the turbid syrup, containing the resins extracted from the drug, is quite as efficient as syrup of licorice, if it does not indeed surpass it. The disguising power of the elixir of yerba santa of the National Formulary, which is a clear and sightly preparation, is not nearly so great as that of the turbid syrup mentioned.—Merck's Rep., Jan. 15, 1897, 38.

Syrup of Peppermint—Formula.—Wm. Weber, among other formulas for preparations suitable for specialties, gives the following for making a syrup of peppermint: Essence of peppermint, free from coloring matter, 640 minims; syrup sufficient to make a pint. This furnishes a preparation which is well liked, and although strong of mint, is very pleasant to the taste, either pure, in teaspoonful doses, or mixed with a little hot water.—Amer. Drugg., Dec. 45, 1897, 366.

Syrup of White Pine Compound—Improved Formula.—Edward L. Schmitt recommends the following formula and process for preparing syrup of white pine compound. He lays particular stress upon the necessity that in this formula, as well as in the two formulas following, the directions should be followed implicitly: White pine, 10.82 av. ozs.; wild cherry, 10.82 av. ozs.; balm of Gilead, 1.5 av. oz.; spikenard, 1.5 av. oz.; blood-root, 0.75 oz. Moisten the drugs, which must all be in No. 30 powder, with a menstruum composed of alcohol, 500 parts; glycerin, 60 parts; water, distilled or boiled and cooled, 1500 parts, all by volume. After mixing well, transfer to a percolator, without packing; cover tightly and allow it to stand 24 hours; then pack quite firmly and pour on the menstruum. Percolate until 5 pints 5 ounces are obtained. Retain this tincture as finished product; then continue the percolation to exhaustion; press out the drugs with a tincture press and retain this weaker tincture for the next lot of drugs. To the 5 pints 5 ounces of reserved tincture add 6¼ pounds of granulated sugar; allow to stand, shaking frequently until dissolved; filter if necessary. Then add 25.7 grains morphine acetate dissolved in 9 fluid drachms of chloroform and 3 fluid ounces alcohol, and shake. This formula will yield a brilliant, deep red, heavy and very palatable syrup, superior to the highly colored article of the manufacturing houses. The syrup will be improved if the tincture is allowod to stand 3 to 6 months before using.

Syrup of Eucalyptus, Compound: Mix together in No. 20 powder, 96 grains of eucalyptus globulus, 120 grains each of elecampane, comfrey, and horehound, and 400 grains of licorice; add the peels of one orange and one lemon, freshly grated; place the drugs in a strong, warm bottle and pour upon them 12 fluid ounces of boiling water and 1 ounce alcohol; cork with rubber stopper and tie firmly. Place on water-bath 12 hours; shake frequently. Allow to cool; press out with press and add 256 grains c. p. ammonium chloride and 12 ounces granulated sugar, and simple syrup sufficient to make one pint.

Syrup of Hypophosphites, Compound is prepared as follows: Prepare a solution of 198 grains of potassium hypophosphite and 128 grains each of manganese and calcium hypophosphites in 6 fluid ounces of water, and filter. Prepare a second solution by dissolving 13⅓ grains of strychnine alkaloid and 51½ grains of quinine alkaloid in 35 grains of a 30 per cent. solution of hypophosphorous acid diluted with 4 fluid drachms of water. Then, to prepare a third solution, put into a small flask 50 grains reduced iron and pour upon it 385 grains of 30 per cent. solution of hypophosphorous acid and 2 fluid ounces distilled water; allow to stand until chemical action ceases (about two days) and to settle. Pour the clear portion upon filter. To the residue in flask 150 grains more acid may be added and after standing a short time filter into first portions. This solution will then contain 160 grains ferrous hypophosphite with some free acid. Mix these three solutions, adding a little more acid to dissolve any precipitate which may form, and add sufficient heavy simple syrup made by percolation to make one gallon. Filter if necessary. This syrup is permanent, palatable and colorless and contains iron hypophosphite in the ferrous condition.—Amer. Drugg., Jan. 10, 1898, 5.

Soda Water Syrups—Practical Observations.—Thomas Warwick gives some practical advice concerning the selection of material, methods of preparation, preservation and dispensing of soda water syrups, in a paper which may be consulted in Drugg. Circ., July, 1897, 180.

Hot Soda Syrups and Preparations—Popular Formulas.—F. A. Fasset, who has a practical experience in a large soda-water trade, makes some practical observations on the management of the syrup and other requisites for dispensing hot soda water. A pre-requisite to success is that the utmost cleanliness be observed in all the details, and specific attention is called to the care of the syrup, the utensils, the cups and glasses, and to the manner of serving. Formulas are given for the syrup and preparations that, in his experience, have the greatest popularity and upon which the bulk of the hot soda trade must be built. The formulas given have proven thoroughly satisfactory.

Beef Tea: Dissolve 7 ozs. of extract of beef and 1 oz. of table salt in 4 pints of hot water.

Beef Bouillon: To 4 pints of "beef tea," prepared as above, add 2 drachms Worcestershire sauce.

Clam Broth: Chop 25 clams finely, add 4 pints of clam juice, 2 ozs. arrow root, 4 ozs. salt, and 1 quart of water; mix well, boil for ten minutes, allow to cool, and strain.

Extract of Coffee: Grind ¾ lb. Mocha and ½ lb. Java coffee to a moderately fine powder, and percolate in a glass funnel or percolator with boiling water, poured on in divided portions, until 2 quarts of percolate are obtained.

Syrup of Coffee: Dissolve 2 lbs. of sugar in 4 pints of "extract of coffee," prepared as above.

Malted Milk Syrup: Dissolve 8 ozs. of malted milk in 8 ozs. of water, and add to 4 pints of simple syrup.

Chocolate Syrup: Boil together 3 cakes of Baker's chocolate, one small package of Cooper's gelatin, 9 lbs. sugar, and 8 pints of water.

Cocoa Syrup: 8 ozs. cocoa, 2 pints hot water, one half sheet Cooper's gelatin, 1 lb. sugar. Boil and strain.—Amer. Drugg., Dec. 10, 1897, 335.

TABELLÆ.

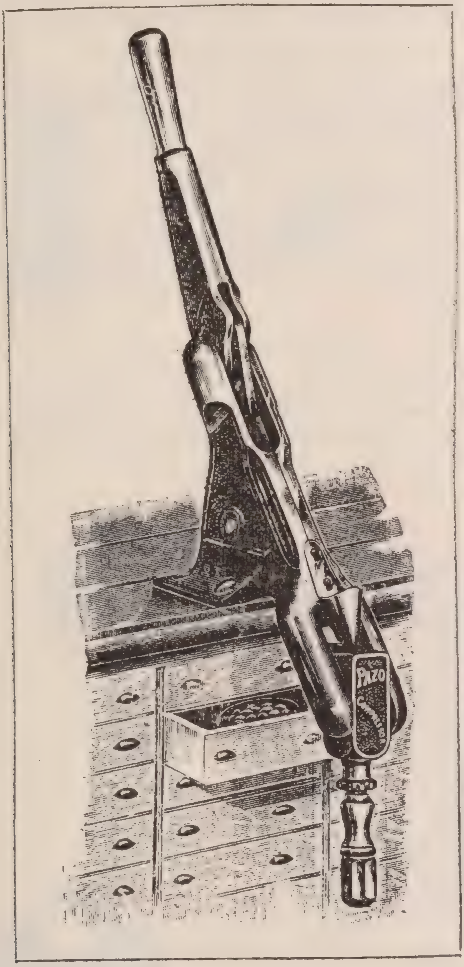
Tablet-Making.—Practicability in Retail Stores.—Jas. W. Milner makes some sensible remarks on the practicability of making tablets in retail stores. Granting that tablets can not be made as cheaply in small quantity, or without costly machinery, is not the pharmacist trying continually to furnish something better? Is there not a large class of people who are as particular about their medicines as their clothes and food? Would they not like a tablet made to fit their case as well as a coat to fit their back?—a fresh, easily-soluble tablet which has been prescribed to exactly fit the case as a coat does the form, instead of taking one which like the ready-made coat is made to fit the general run of humanity with a general line of complaints? Will not the doctors leave their ready-made tablets and come to us for one a little stronger, or weaker, or an ingredient added, as they desire.—Proc. Ala. Phar. Assoc., 1897, 22–23.

Compressed Tablets and Tablet Triturates—Suggestions as to their preparation.—Frank Edel has also written a paper in which he gives some practical hints on the preparation of tablets—triturates and compressed. He holds that the pharmacist must be able to supply these goods, and he should place himself in position to produce them as wanted. This very interesting paper unfortunately cannot be condensed with advantage, and must, therefore, be consulted in the original in West. Drugg., April, 1898, 155–156.

Tablet Compressor—A New and Advantageous Form for the Prescrip-

tion Counter.—R. Darton Gibbs has devised the tablet compressor shown by Fig. 66, which he has named the "Pazo." While intended primarily for use at the dispensing counter, it is also provided with a feeding arrangement, whereby, after proper adjustment the weighing for each tablet becomes unnecessary, the machine delivering the tablets compressed to an equal degree and of identical weight; but in this case, as in other compressors, the powder has to be previously granulated, whilst when the quantities for each tablet are weighed no such preliminary preparation is needed. The compressor is screwed to the edge of the counter, and movement of the upper die effected by pulling the lower forward. The

FIG. 66.

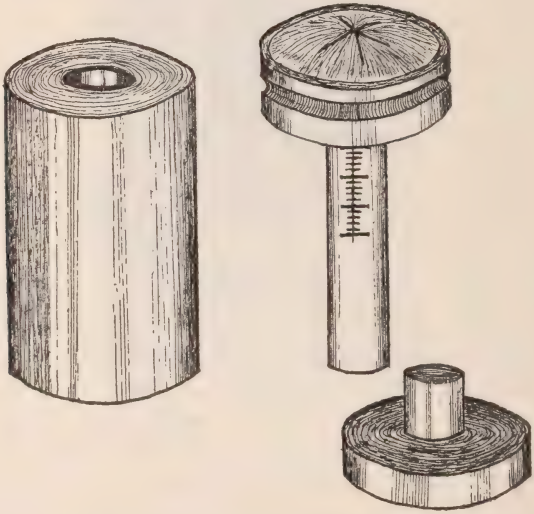


Tablet Compressor.

powder is fed into the mould through the funnel attached to the front of the machine, and falls into the lower die. At the bottom of this is an adjustable screw, by means of which the thickness and hardness of the tablet can be regulated to a nicety, while at the back, hidden by the framework of the machine, is a projecting spur. On drawing the lever forward, the piston carrying the descending die comes in contact with this spur, and the mould is automatically brought into position; at the same time the upper and lower dies firmly compress the powder between them, whilst on reversing the lower the finished tablet is automatically ejected and falls into an open drawer. An important point claimed by the author is that the amount of pressure imparted to the descending die is quite independent of the force employed by the operator in depressing it, the advantage in this respect over other small compressors being marked.—Pharm. Journ., Dec. 18, 1897, 548.

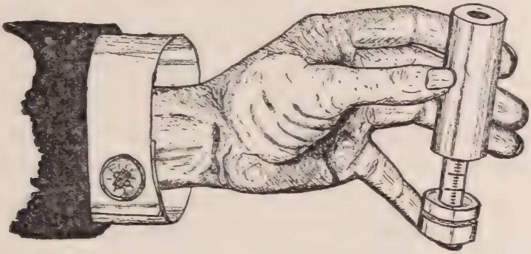
Compressed Tablets—Modification of a Simple Compressor.—B. E. Nelson describes a modification of an old and simple form of a tablet compressor, and of its use. The essential parts of the compressor are shown by Fig. 67, and the method of holding it while filling by Fig. 68. It consists of a metal cylinder, turned from a section of steel shafting, 25 Mm. in diameter and 50 Mm. long, with an upper and lower die also turned from the same material. The upper die is graduated into millimeter divisions, and is of the same length as the cylinder, the bore of which it fits accurately; the lower die is much shorter. The top of the upper die comes to an obtuse point, so that blows received upon it fall directly on the central line so as to prevent its being bent. Holding the compressor and upper

FIG. 67.



die in the position shown by Fig. 68, which may be regulated by the last finger, the prepared and weighed powder is introduced by the aid of a gutter-shaped oblong piece of tin. The die is now moved up until the powder is level with the top; the number of divisions occupied by the powder is read off on the piston, which is then allowed to drop back, and the lower die introduced from above. The filled compressor is now inverted and placed in one of the holes made for the purpose in a block of wood, and struck a sharp blow with a wooden mallet; the cylinder is then emptied by placing it over a second hole in the block, which is open beneath, and giving the upper die a gentle tap. The succeeding tablets need not be weighed, it being sufficient to shove the die up to the mark ascertained when making the first tablet, filling the compressor with powder, striking off any excess, and then to compress as before. To obviate jarring and to deaden the sound, the wooden block should be provided with a cushion of rubber. The apparatus can, of course, be constructed of various sizes for different tablets.—Merck's Report, July, 1897, 399.

FIG. 68.



Calomel Tablets—Decomposition into Corrosive Sublimate on Standing.—See *Calomel,* under "Inorganic Chemistry."

Effervescing Tablets of Artificial Vichy Salt with Lithium—Formula.—The "Cincinnati Academy of Pharmacy" publishes the following formula for tablets, each containing 3 grains of artificial Vichy salt (N. F.) and 4 grains of lithium citrate: Take of artificial Vichy salt (N. F., 338), 195 Gm.; lithium citrate, 260 Gm.; saccharated sodium bicarbonate (N. F., 341), 273 Gm.; saccharated tartaric acid (N. F., 8), saccharated citric acid (N. F., 5), of each 136 Gm. Granulate according to the general formula (N. F., 319 B.), and divide into 1000 tablets by pressure.—Amer. Drug., March 10, 1898, 130.

TINCTURÆ.

Tinctures—Preparation from Fluid Extracts.—In a paper read at the eighteenth annual meeting of the Iowa Pharmaceutical Association, 1897, C. Schadt makes some remarks on the advisability of preparing tinctures from fluid extracts. Like many who have writen upon this subject before him, he fails to take a positive view and therefore leaves the question an open one. Under one view of the case it would appear that if the tincture and the fluid extract are prepared with the same menstruum, simple dilution of the fluid extract with the same menstruum would seem to produce a tincture that corresponds in essentials to the pharmacopœial requirements. This presumes that the fluid extract accurately represents all the active constituents of a corresponding quantity of the drug. The question may, however, arise whether the prescribed quantity of solvent in the fluid extract is capable of holding all the active matter in solution, and if this is negatived, then the tincture prepared from the fluid extract, though the menstruum be the same, cannot be an accurate product within the intention of the Pharmacopœia. As to the preparation of tinctures from fluid extracts in which the menstruum differs, the complication is still greater. Presuming here, also, that the fluid extract accurately represents the drug, the larger quantity of a weaker menstruum used to make the dilution may completely dissolve the active principles and hold them in solution; but whether or not can only be determined after due consideration and experiment in each case.—Proc. Iowa Pharm. Assoc. 1897, 47.

Some remarks pertinent to the same subject are made by two writers in the Proceedings of the Indian Territory Pharmaceutical Association, but both of these take a positive view of the question. H. D. Knisely feels convinced that even when prepared with honest intention and utmost skill, fluid extracts do not represent the entire active property of the drug. Consequently a dilution of the fluid extract cannot possess the virtue of a tincture prepared from the drug, even if the conditions are most favorable. But fluid extracts when exposed to air, light or change of temperature, become altered by either, or both precipitation and gelatinization, and the tinctures made from such cannot be of the proper strength, whereas tinctures made from the drug direct, being more dilute, retain their virtues for a longer period. The drift of the second writer's observations, W. O. Trott, is in the same direction. He says: "Tinctures should always be made from the crude drug. The practice of making tinctures from fluid extracts should never be tolerated in any drug store, because fluid extracts are not of a uniform strength, and have not been made with the proper menstrua for tinctures. The action of heat, cold and light, as well as air, has a deleterious influence on fluid extracts," and "if you will take the trouble to examine your fluid extracts on the shelves of your store, you will find a precipitate in almost every bottle."

Alkaloidal Tinctures—Assay of Commercial Samples.—Clarence A. Seyler has determined the percentage of alkaloid and of solid matters in commercial (B. P.) tinctures of nux vomica, belladonna, hyoscyamus, aconite, cinchona and opium. He found in all cases considerable variation from the alkaloidal standard in different samples of the same tincture, and that, with the exception of the tinctures of opium, nothing like an approximate correspondence between the amount of solids and alkaloid existed, and here only to the extent that those with the most alkaloid generally contained a larger amount of extract.

Tincture of Nux Vomica, which should contain 0.229 part of alkaloids per 100 volumes, contained 0.226, 0.216, 0.202, 0.200, 0.196, 0.190, and 0.114 parts.

Tincture of Belladonna, normally suggested to contain 0.026 parts of alkaloid, contained 0.028, 0.023, 0.019, 0.014, and 0.014 parts.

Tincture of Hyoscyamus, with a suggested standard of 0.010 parts in 100 volumes, contained 0.003, 0.011, 0.013, and 0.014 parts.

Tincture of Aconite, which should contain 0.050 parts of alkaloid, contained 0.0628, 0.060, 0.052, 0.050, 0.045, 0.044, 0.036, 0.026, 0.025, and 0.012 parts.

Compound Tincture of Cinchona, assumed normal strength 0.5 per cent., contained 0.73, 0.42, 0.37, 0.348, 0.346, 0.33, 0.32, 0.30, 0.20, and 0.15 per cent.

Simple Tincture of Cinchona, assumed normal strength 1 per cent., contained 0.586, 0.42, and 0.15 per cent.

Tincture of Opium, which should yield by the process of assay adopted by the author (Dott's modification of the method of Teschemacher and Smith) should yield practically 0.6 to 0.7 per cent. of morphine, yielded the following percentage: 0.649, 0.664, 0.736, 0.844, 0.851, 0.855, 0.872, 0.906, 0.933 and 1.120 per cent. The method of assay adopted by the author for the other tinctures is more conveniently considered in connection with *Alkaloids*, which see under "Organic Chemistry."—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1897, 420–427.

Resinous Tinctures—Emulsification with Water Alone.—Wm. Duncan has found that in the case of mixtures consisting of a resinous tincture and a watery menstruum, a satisfactory and permanent emulsion could be made by filling the bottle three-fourths full of the menstruum and adding the tincture by pouring it through a small funnel into the centre of the liquid and so as not to touch the sides of the bottle, and then shaking thoroughly, but not violently or too long. In this way perfect emulsions of six ounces each were obtained with ½ oz. of tincture of Indian hemp, or 1 oz. of tincture of guaiac or myrrh. The guaiac emulsion alone had a tendency to separate, but could be easily diffused again by shaking. Salts interfere with the permanence of the emulsion, however.—Phar. Jour., Jan. 22, 1898, 82.

Tinctura Aurantii Dulcis—A Good Formula and Process.—Ed. E. Williams recommends the following formula and process for making tincture of sweet orange peel: Reduce 200 Gm. of the rind of fresh sweet oranges with an equal quantity of pumice, in lumps, in a wedgewood mortar to powder. Transfer to a narrow percolator without pressure, and gradually pour on alcohol until 1000 Cc. of tincture are obtained.—Amer. Drug., March 10, 1898, 125.

Tincture of Nux Vomica—Commercial Quality.—L. A. Harding reports upon the examination of five samples of tincture of nux vomica. Two showed an alkaloidal percentage of 0.3 per cent., two others were somewhat in excess of this, while the fifth was somewhat deficient. Three of the samples, showing a residue of more than 2 per cent. of residue on evaporation, were evidently not made from the extract as directed by the U. S. P., but probably from the drug direct.—Proc. Minn. Pharm. Assoc. 1897, 53.

Tinctura Cantharidis, B. P.—Proposed Preparation from Cantharidin.—Greenish and Wilson are prompted by their investigations concerning *Cantharides*—which see under "Materia Medica"—to suggest the preparation of tincture of cantharides from its active constituent, cantharadin, as follows: Cantharidin, 1 part; chloroform, 100 fluid parts; rectified spirit, enough to make 10,000 fluid parts. The cantharidin is dissolved in the chloroform and the spirit added. This strength corresponds to that of the B. P. under the assumption that the whole of the cantharidin would be removed from flies of average strength, containing 5 per cent. of cantharidin—Pharm. Journ., Mar. 12, 1898, 259.

Tinctura Opii—Efficient Process of Preparation.—Ed. E. Williams recommends the following process for preparing tincture of opium as being superior to that of the U. S. P.: Take powdered opium, powdered pumice, of each 200 Gm.; water at 90° C., alcohol, of each 400 Cc.; diluted alcohol, enough to make 1000 Cc. of tincture. Mix the opium intimately with the pumice and transfer to a flask. To this add the water at 90° C., and agitate the smooth creamy mixture frequently during 12 hours. Then add the alcohol, mix thoroughly and transfer to a cylindrical percolator. Return the first portions of the percolate until it comes through clear, then allow percolation to proceed until the liquid ceases to drop from the percolator. Then pour upon the residue, in the percolator, dilute alcohol in small quantities until the percolate measures one thousand cubic centimeters. The last portions of the percolate will be colorless and tasteless, thus showing how thoroughly the medicinal qualities of the drug have been extracted.

Tinctura Opii Camphorata—Convenient and Efficient Formula.—Mr. Williams also recommends the following formula for paregoric, which has been warmly commended by physicians: Deodorized tincture of opium (U. S. P.), 40 Cc.; benzoic acid, camphor, of each 4 Gm.; oil of anise, 4 Cc.; glycerin, 40 Cc.; alcohol, water, of each 400 Cc.; diluted alcohol, enough to make 1000 Cc. of tincture. Dissolve the benzoic acid, camphor and oil of anise in the alcohol, add the glycerin and then the water, very slowly and in divided portions, agitating after each addition. Lastly add the tinct. opii deod. and filter through paper, returning the first portions if necessary until clear. When the liquid ceases to drop from the funnel, pass enough diluted alcohol through the filter to make the finished product measure one thousand cubic centimeters.—Amer. Drugg., May 10, 1898, 252.

Laudanum—Etymology of the Word and Probable Origin.—C. W. Dodd traces up the etymology of the word "laudanum," which has evidently been transferred from the gum of the *Cistus* to a tincture of opium, for there can be no reasonable doubt that laudanum, ladanum, and labdanum are only different ways of spelling the same word. Clusius, writing in the sixteenth century, says, "the gum of the *Cistus* is called in Greek and Latin ladanum, and in the shops laudanum." Skeat, in his "Concise Etymological Dictionary," fully discusses the word laudanum, and shows that it is certainly the same as ladanum. Whilst reading the "Life of Paracelsus" in the "Penny Cyclopedia," Mr. Dodd found that this alchemist, before the middle of the sixteenth century, was the inventor of a wonderful panacea, which he called laudanum. In the dictionary at the end of his biography it is thus described: "Laudanum Paracelsi est medicina *laude digna*, ex duabus tantum rebus constans, quâ morbos fere omnes curabat." As the same biography tells us that Paracelsus was the first to bring opium into general use as a medicine, and as the composition of laudanum was kept by him a secret, it is highly probable that it was a mixture of opium and the gum of the *Cistus*, which would operate powerfully as an anodyne, and become as universal a popular remedy as chlorodyne at present is in France. The words *laude digna* in the above passage show the probable origin of the absurd derivation *laudanum, i. e.*, "to be praised," which will be found given for laudanum in almost all old dictionaries.—Pharm. Journ., Feb. 26, 1898, 183; from Gardeners' Chronicle, xxiii., 166.

Tincture (Extract) of Vanilla—Advantage of Ageing.—John K. Williams makes some practical observations on the manufacture of extract of vanilla. The cut beans are bruised with an equal weight of rock candy, placed in a keg of suitable capacity, a mixture of ten volumes of alcohol and one of water is poured on, then follow immediately with water boiling hot (sufficient to reduce the previously added menstruum to proper alcoholic strength?—REP.). Shake frequently every day during four weeks, then draw off the liquid, *and keep it for at least a year before offering it for sale.* The extract is improved by age, two to five years being still better than one. The extract also should never be filtered, but should be decanted clear. By adding some of the original menstruum to the dregs in the keg, macerating as before, and decanting, this can be used for a fresh lot of vanilla.—Bull. Pharm., Sept., 1897, 402; from Proc. Conn. Pharm. Assoc., 1897.

Tincture of Vanilla—Formula and Details for Preparing.—Oscar Kalish gives the following formula for making an excellent tincture of vanilla, and describes the manipulations in detail. As between Bourbon and Mexican vanilla he gives decided preference to the Mexican. It is important, of course, that the vanilla should be of prime quality and the other ingredients the purest of their kind. He mentions also that contact with iron implements should be avoided as far as possible, as such contact destroys the flavor very quickly. The formula is as follows: Mexican vanilla beans, cut in pieces about three-fourths of an inch long, 3½ lbs. av.; granulated sugar, 7 lbs. av.; cologne spirit (190° proof), 4 gallons; water,* 3 gallons. Upon the vanilla, in a porcelain jar, pour seven pints of boiling water, cover, and let stand twenty-four hours. Decant the liquor, and cut or grind the swelled vanilla as fine as possible—the finer the better—in a sausage cutter. Now macerate the vanilla in a porcelain jar with seven pounds of sugar, the decanted liquor, and three pints of water, for twenty-four hours, stirring frequently; then add one gallon of cologne spirits, macerate for a week, add another gallon of spirits, macerate again for a week, and then add four pints more of the spirits. This last addition renders the liquid, which up to this time has a turbid appearance, clear, and it requires no filtration in the further treatment. The mixture is now allowed to macerate thirty days more, is then transferred to a Squibb's percolator, covered with a muslin diaphragm, and after the liquid has run through, percolation is continued with a mixture of twelve pints of spirits and nine pints of water. The percolate will pass perfectly bright and clear, ready for use.—Bull. Pharm., March, 1898, 107.

Tincture of Vanilla — Preparation from Vanillin.—Adolph Heming states that the quality of "vanillin" has been improved considerably in recent years. A vanillin is now obtainable in large crystals, which are prepared by slow crystallization instead of by precipitation. It is said to be much stronger and of better flavor than the small white crystals usually met with, and is not white, but of a light amber color; it also brings a higher price. If a tincture or extract of vanilla is to be made from it, this should be allowed to stand for about two weeks before it is used, and it should be invariably prepared with an addition of simple syrup to the spirituous solution of vanillin, because sugar has the property of bringing out the flavor. The consumption of vanillin has heretofore been confined to confectioners and cracker bakers, apparently on account of the convenience of its use.—Bull. Pharm., March, 1898, 112.

Tincture of Iceland Moss as an Anti-emetic.—This is prepared in the proportion of 1 part of cetraria to 5 parts of 80 per cent. alcohol, see *Iceland Moss* under "Materia Medica."

Denzel's Hæmostatic Tincture—Formula.—The following formula is given in "Pharm. Ztg." (1898, 167): Powdered ergot, 10 Gm.; alcohol,

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* In the detailed description, the amount of water is five pints short of this quantity.

94 per cent., 20 Gm.; sulphuric acid, 2 Gm. Mix and add hot water, 500 Gm. Boil until evaporated to 200 Gm., then add calcium carbonate, 2 Gm. Strain and press, evaporate to 70 Gm.; add alcohol, 94 per cent. 30 Gm.; essence of ginger, 3 drops.

Toluenated Tincture of Ferric Chloride (Lœffler's Solution)—Formula.—The "Cincinnati Academy of Pharmacy" publishes the following formula for preparing "Loeffler's Solution": Solution of ferric chloride, 40 Cc.; toluene, 370 Cc.; absolute alcohol, a sufficient quantity to make 1000 Cc. This preparation, which is used locally for faucial diphtheria, should be kept in dark-colored bottles. The

Toluenated Tincture of Ferric Chloride with Menthol is made by substituting for 70 Cc. of the toluene directed in the foregoing formula, 100 Gm. of menthol. It should be kept like the plain Lœffler's Solution, and is used for the same purpose. A third tincture, for which a formula is given by the same association, is

Compound Tincture of Viburnum Opulus.—It is prepared as follows: Fluid extract of viburnum opulus, 150 Cc.; fluid extract of scutellaria, fluid extract of dioscorea, fluid extract of trillium, fluid extract of aletris, of each 50 Cc; tincture of cinnamon, 650 Cc. Mix, allow to stand a few days, and filter.—Amer. Drugg., March 10, 1898, 130.

Tincture of Iodine—Rapid Preparation by Percolation.—Looking for a more rapid way than the official method to accomplish the solution of the iodine in making the tincture, Albert E. Brown tried the process of percolation and found it to accomplish the purpose perfectly. The percolator is prepared with cotton, &c., in the usual manner, the iodine is introduced in scales—not powdered—and the whole of the alcohol required is poured on. In 15 to 20 minutes the alcohol will have percolated through the cotton, carrying with it all the iodine perfectly dissolved. By the official method of trituration and agitation, from 2 to 3 hours is required to effect the solution of all the iodine.—Proc. Alabama Pharm. Assoc. 1897, 15–17.

Tincture of Iodine—Estimation of Hydriodic Acid.—Richard proposes the following method for the estimation of hydriodic acid in tincture of iodine, which is based on the decomposition of hydriodic acid by potassium iodate. A solution of sodium thiosulphate, 1.96 per cent., is placed in a burette and run gradually into 10 Cc. of the tincture to complete decoloration, in the usual manner, and the quantity noted; to the decolorized tincture some drops of 2 per cent. solution of potassium iodate are added; if any coloration is produced, it is due to the presence of hydriodic acid; this is again decolorized by the thiosulphate solution, more iodate is added, and the process repeated till no further coloration is caused. The difference between the quantity of thiosulphate solution required to decolorize the original tincture and that required to decolorize it after addition of the iodate, gives the quantity of hydriodic acid present.—Can. Pharm. Journ., Aug. 1897, 43; from L'Union Pharm., 1897.

TROCHISCI.

Glycyrrhizin Lozenges—Formulas.—Vechtmann gives three formulas for making glycyrrhizin lozenges. According to the first formula, 1 Gm. of ammoniated glycyrrhizin, 20 Gm. of starch, and 80 Gm. of sugar, are made into a mass, flavored with 1 drop of cherry laurel, and divided into 100 pastilles. The second formula requires the same ingredients, with the addition of 0.5 Gm. of codeine hydrochloride; while the third formula differs from the second in increasing the quantity of codeine hydrochloride to 2 Gm., omitting the oil of cherry laurel, and that they may be eaily distinguished, coloring the pastilles with carmine.—Pharm. Centralh., 1897, 721; from Pharm. Weekblad.

Santonin Pastilles—Method of Preparation.—C. Bedall recommends the following method of preparing santonin pastilles: To 100 Gm of pepared cacao, melted on a water-bath, a mixture of 5 Gm. of santonin and 95 Gm. of sugar, in fine powder, is added, and intimately mixed. The mass is then transferred to a sheet of oiled paper, covered with a second sheet, and rolled out to the desired thickness. The upper layer of oiled paper having been removed, the mass is divided into pastilles by means of a punch; or it may be allowed to cool, then pulverized, and compressed into tablets of 1.0 Gm. each.—Pharm. Post, Oct. 24, 1897, 534.

TRADE-NAMED REMEDIES AND PREPARATIONS.*

Barasol—A Trade-named Disinfectant.—A new disinfectant, which is recommended to be used in 5 per cent. solution, is marketed under the name "barasol." It is a clear, reddish-brown, oily fluid, having a tarry odor, and, in aqueous solution—an alkaline reaction.—Merck's Rep., Aug. 1, 1897, 464.

Bismutan—A Compound of Bismuth, Resorcin and Tannin.—Dr. Bion recommends as a remedy, particularly useful in the treatment of diarrhœa in children, a preparation to which the name "bismutan" has been given. It is a canary-yellow, odorless, sweetish powder, insoluble in water, and is composed of bismuth, resorcin and tannin, but the proportions are not stated. It is given to children under two years in mixtures—with mucilage of acacia—containing from 1.2 to 2.5 Gm. in 100, in teaspoonful doses; to adults, doses of 0.5 to 1 Gm. of the powder.—Pharm. Centralh., Feb. 17, 1898, 109; from Corresp. Bl. f. Schweiz. Aertzte, 1898.

Cerealbin—A Compound of Albumin and Creolin.—Attention is directed in "Journ. de Pharm. d' Anvers" (1898, 62), to a combination of creolin and albumin, which has been named "cerealbin." It is obtained by dissolving 100 parts of dried egg albumin in water, adding to the clear solution a mixture of 100 parts of creolin and 1000 parts of water, and then sufficient of 10 per cent. hydrochloric acid to precipitate the cerealbin. The precipitate is collected, drained, pressed, dried on the water-bath, powdered, and again dried at 115 to 120° C.—Pharm. Jour., April 30, 1898, 410.

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* This does not include trade named preparations and compounds that are direct derivatives from recognized chemical compounds and are known to have a definite composition. Many such will be found distributed in the portion of this report devoted to "Organic Chemistry" under proper headings.—*Rep.*

Enterorose—A New Dietetic.—Under the name of "enterorose" a new dietetic agent, which is said to be useful in catarrhal affections of the stomach and bowels, is described in "Wien. Med. Bl. (1897, 664). It is said to be prepared from vegetable albumin, diastase, and meat solutions, and constitutes a white, or faintly yellowish powder, which is absolutely permanent, and easily suspended in water.—Pharm. Centralh., Oct. 22, 1897, 728.

Glandulen—A New Remedial Agent from the Bronchial Glands.—According to "Apotheker Zeitung" (1898, 59), glandulen is prepared from the bronchial glands of animals, preferably sheep, by extracting them with water, and precipitating the extract with acids. The precipitate is washed, dried, and after mixing with milk sugar, generally compressed into tablets.

Granuline—A New Cleansing Compound.—Gochlid describes a new washing compound, marketed under the name "granuline," which, he states, consists principally of soda soap (87.5 per cent.) and sodium carbonate (12.5 per cent). It is a whitish-yellow brittle body, somewhat fatty to the touch, has a faint odor of bergamot, and forms a strongly alkaline solution with either cold or hot water.—Pharm. Post, 1897, 588.

Gastromyxin—A New Digestive Preparation.—According to the "Pharm. Post," gastromyxin is a newly introduced digestive agent prepared from the gastric juice of oxen. It constitutes a brownish-yellow powder, and has a faint aromatic odor.

Hydrargyroseptol—A New Antisyphilitic.—Under the name hydrargyroseptol a compound of quinosol, mercury and sodium chloride, having the composition $C_9H_6N.O.SO_3Hg + (NaCl)_2$, has been introduced as an antisyphilitic. It resembles the yolk of egg in consistence, swells in water, dissolves in about 20 parts forming a clear lemon yellow solution, which gives the reaction of both quinosol and mercury, and has a slight peculiar odor, and an insipid taste developing to acridity.—Pharm. Ztg., xlii, 362.

Hygiama—A New Alimentary Product.—Under the name of "hygiama," a powder recalling cacao by its taste and appearance, has been introduced as a suitable and efficient food in cases where it is necessary to have recourse, for a prolonged period, to an exclusively liquid alimentation.

It is said to be prepared from condensed milk, to which partially-defatted cacao and specially-prepared cereals have been added. It is also employed in gastric and intestinal affections, in phthisis, in the convalescence from febrile affections, and in debility of children.—Merck's Rep., Sept. 1, 1897, 541; from L'Union Pharm., xxxviii., 298.

Mayol—A Trade-Named Preservative.—E. May has introduced a preservative for meat which, according to Prof. K. Than, is a mixture of boric acid, glycerin, ammonia, fluoride, methyl alcohol, and ethyl alcohol—proportions not stated. It is said that meat treated with this preservative, by which it becomes coated with a crust, remains fresh beneath the crust for several weeks.—Pharm. Centralh., 1897, 506.

Menthoxol, Camphoxol and Naphthoxol—A New Class of Germicides.—Under the names here given a new class of preparations have been introduced, which, according to Beck, have been proven to possess powerful germicidal properties. They are said to be combinations of a 3 per cent. hydrogen peroxide solution with alcoholic solutions of menthol, camphor, and naphthol respectively, the strength of the alcoholic solutions being, however, not mentioned. Wagner has employed these "oxols" in 10 per cent. solution in the treatment of abscesses and suppurating wounds with advantage, all three oxols acting alike and with equal efficiency. They are perfectly free from any irritating effect, and prove to be energetic deodorants, menthoxol being specially useful for the latter purpose.—Pharm. Journ., April 30, 1898, 411; from Deutsch. Med. Wochenschr., through Nouv. Rém., xiv., 112.

C. Raspe prepares these disinfectants by combining in alcoholic (38 per cent.) solution, hydrogen dioxide, 3 per cent.; and camphor 1 per cent.; or menthol, 1 per cent.; or naphthol, 2 per cent. These solutions appear to be stable, no diminution in the percentage of hydrogen dioxide having been observed after three months.—Pharm. Centralh., Nov. 11, 1897, 763.

Protektin—An Adhesive Fabric for Surgical Use.—Dr. Kuhn calls attention to "protektin," an adhesive fabric prepared by coating one side of thin tissue paper with a solution of caoutchouc of certain composition, then covering the adhesive surface with gauze so as to permit it to be rolled up, sterilized, and packed in sterilized containers. In antiseptic operations pieces of this paper are applied to the surface adjacent to the field of operation, the gauze covering having been removed. After the operation the paper is easily destroyed by burning.—Pharm. Centralh., Sept. 23, 1897, 263; from Münch. Med. Wochenschr., 1897, 982.

Psilothinum—A New Depilatory.—According to "Merck's Report" (Aug. 1, 1897, 464), psilothinum, a new depilatory, is a mixture containing 40 per cent. of elemi, 10 per cent. of benzoin, 8 per cent, of resin, 10 per cent. of yellow wax, and 30 per cent. of diachylon plaster. It is applied with a hot, flat piece of metal and then allowed to cool, after which it is removed with the superfluous hair adhering.

Tegmin—A Protective Coating.—An emulsion, which is stated to be prepared from 1 part wax, 2 parts acacia, 3 parts water, together with a small quantity of lanolin and 5 per cent. of zinc oxide, has been introduced, under the name "tegmin," by Dr. Paul, as a protective coating in vaccination and surgical operations. It forms an elastic, smooth, white coating when applied to the skin, but it can also be used as a vehicle for medicinal substances.—Pharm. Ztg., Feb. 12, 1898, 105; from Wien. Med. Or., 1898, 6.

MISCELLANEOUS PREPARATIONS.

Laminaria Tents—Preparation—Antiseptic Preservation.—L. Adrian calls attention to the employment of the dried stems of *laminaria digitata* in place of sponge tents. The solid black pieces, about the size of a goose quill, when introduced into the cavity, evenly swell to six times their volume. Before their introduction, the surface is roughened by a grater or file, and they are then plunged into tepid water for some minutes. They may be preserved in one of the following solutions:

a. Corrosive sublimate, 1 part; absolute alcohol, 100 parts.

b. Corrosive sublimate, 1 part; ether, 100 parts.

c. Iodoform, 10 parts; ether, 100 parts.—Amer. Jour. Pharm., Nov., 1897, 609; from Nouv. Rem., *13*, 483.

Agar-Agar Jelly—Use as an Ointment Basis—Gallois recommends the use of agar-agar jelly for the application of various drugs to the skin, agar-agar possessing the great advantage over gelatin, that in drying on the skin it does not contract. Thus a

Corrosive Sublimate Jelly is made by preparing a jelly with 1 part of agar-agar and 100 parts of water, in which 10 centigrams each of corrosive sublimate and tartaric acid have been dissolved. Small portions of this rubbed on the affected part quickly dry, producing a closely adhering film, which has been found very effective in the treatment of erysipelas.

Oxide of Zinc Jelly is made by incorporating 20 parts of oxide of zinc with a jelly made from 2 parts of agar-agar and 200 parts of water.—Pharm. Journ., April 2, 1898, 325; from Bull. Gén. de Thérap. cxxxv., 223.

Gray's Glycerin Tonic Compound—A long-established Article of Stock among Boston Pharmacists.—William L. Cliffe communicates the following formula for Gray's Glycerin Tonic Compound, with the statement that this formula has for years been known to Boston pharmacists and very commonly prescribed by physicians. The formula, as furnished to the author several years ago by Kelley and Durkee, is as follows: Gentian root No. 40, 3¾ ounces Troy; sherry wine, sufficient to percolate 26 fluid ounces. To percolate add: extract of dandelion, 4⅞ ounces Troy; glycerin, 26 fluid ounces; dilute phosphoric acid, 478 fluid ounces; compound tincture of cardamon, syrup of lemon, syrup of orange peel, of each 6½ fluid ounces.—Amer. Jour. Pharm., April, 1898, 201.

Antiseptic Mouth Wash—Formula.—The following formula is given in "Odontologie" (v., 404): Cresol, 2 Gm.; saccharin, 1 Gm.; oil of peppermint, 10 drops; aromatic tincture (Ph. G.), 25 Gm.; tincture of rhatany, 50 Gm.

Tooth Powders—New Formulas.—The following formulas for tooth powders are given in "Pharm. Ztg." (1897, 355), in which the basis is precipitated chalk and the perfume oil of rose: To 50 Gm. of this basis add, 0.1 Gm. of menthol, 0.05 Gm. β-naphthol, 0.025 Gm. saccharin, 0.5 Gm. of soap; or, add to the same quantity of perfumed basis: myrrh, 1.0; sodium chloride, 1.0; soap, 0.5 Gm. In the second formula the sodium chloride is added to improve the taste of the myrrh.

Fruit Flavors—Development from the Leaves.—Jaquemin has made the interesting observation that the addition of the leaves of fruit trees, which in themselves have no flavor, to saccharine solutions undergoing alcoholic fermentation, develops a very marked bouquet of the fruit. Thus, by immersing pear or apple-tree leaves in a 10 or 15 per cent. solution of sugar, and adding a pure yeast, after fermentation a liquid was obtained which had a strong odor of pear or apple, respectively, and in the distillate obtained from them this aroma was still more marked. The same is true of grape leaves, and it is suggested that it may be possible to improve the bouquet of a poor vintage by the addition of some leaves during the fermentation. These results are far more marked when the leaves employed are from plants in which the fruit is approaching maturity. The author infers that the flavors of fruits are due to a body elaborated in the leaves, which is not transferred to the fruit until the latter approach maturity.—Pharm. Jour., Aug. 28, 1897, 192; from Compt. rend., cxxv., 114.

Perfumes—Selected Formulas.—The following formulas for perfumes given by the "Pharmaceutical Post" possess the merit of dealing with absolute quantities of the ingredients, though, in some cases, it remains very uncertain what the strength of these ingredients should be. They may, nevertheless, prove useful, and as given in "Pharm. Journ." (Sept. 4, 1897), may find place here.

Bouquet.—Extracts of violet, 900 Gm.; tubéreuse, 500 Gm.; rose, 800 Gm.; tincture of musk, 120 Gm.; tincture of ambergris, 20 Gm.; oil of bergamot, 7 Gm.; oil of lemon, 2 Gm.; oil of neroli, 4 Gm.

Magnolia.—Extracts of jasmin, 375 Gm.; rose, 750 Gm.; orange, 750 Gm.; tubéreuse, 190 Gm.; tincture of tonka, 300 Gm.; tincture of vanilla, 25 Gm.; tincture of musk, 50 Gm.; oil of lemon, 25 Gm.; oil of bergamot, 2 Gm.; oil of neroli, 2 Gm.; oil of geranium (Afr.), 1 Gm.; genuine bitter almond oil, 5 Gm.

Jockey Club.— Extracts of jonquille, 2500 Gm.; jasmin, 300 Gm.; violet, 200 Gm.; rose, 200 Gm.; tonka tincture, 1500 Gm.; benzoin tincture, 300 Gm.; musk tincture, 200 Gm.; geranium oil (Afr.), 60 Gm.; oil of bergamot, 20 Gm.

Heliotrope.—Extracts of rose, 4 kilos; cassia, 2 kilos; jasmin, 2 kilos; jonquille, 1½ kilo; tincture of tonka, 1550 Gm.; tincture of vanilla, 350 Gm.; tincture of musk, 10 Gm.; tincture of civet, 15 Gm.; genuine bitter almond oil, 2 Gm.; oil of angelica, 2 Gm.; oil of cloves, 2 Gm.; oil of geranium (Afr.), 2 Gm.

Mignonette: Extracts of mignonette, 5 kilos; violet, 3½ kilos; rose, 3 kilos; jasmin, 2½ kilos; cassia, 300 Gm.; orange, 500 Gm.; jonquille, 600 Gm.; oil of bergamot, 115 Gm.; oil of cinnamon, 1 Gm.; oil of geranium (Afr.), 2 Gm.; oil of orris (liquid), 10 Gm.; oil of basilicum, 2 drops; oil of sandalwood, 2 drops; ylang-ylang oil, 5 drops; tincture of musk, 15 Gm.

Syringa: Tonka tincture, 2½ kilos; vanilla tincture, 2½ kilos; musk tincture, 2½ kilos; ylang-ylang tincture, 2 kilos; opoponax tincture, 2 kilos; helotropin tincture, 2 kilos; oil of rose, 2 Gm.; neroli oil, 2 Gm.; patchouli oil, 1 Gm.

Violet: Violet extract, 5 k.; jasmin extract, 20 Gm.; rose extract, 10 Gm.; jonquille extract, 30 Gm.; tincture of orris, 50 Gm.; tincture of cinnamon, 30 Gm.; tincture of musk, 2 Gm.; tincture of ambrette, 20 Gm.; tincture of vanilla, 2 Gm.; jasmine water, 200 Gm.

New-mown Hay: Rose extract, 2000 Gm.; cassia extract, 600 Gm.; jasmin extract, 450 Gm.; jonquille extract, 300 Gm.; tincture of tonka, 1500 Gm.; tincture of musk, 5 Gm.; anise oil, 3 Gm.; geranium oil, 5 Gm.; oil of peppermint (Mitcham), 2 Gm.; basilicum oil, 2 Gm.; patchouli oil, 1 Gm.; cumarin, 20 Gm.

Lilas de Perse: Extracts of jasmin, 2 kilos; tubéreuse, 1; jonquille, 1; orange, 1; rose, 1 kilo; tinctures of ylang-ylang, 100 Gm.; musk, 25; ambergris, 25; terpineol, 50 Gm.

Ylang-Ylang: Extracts of jasmin, 1 kilo; rose, 1 kilo; tubéreuse, 2, tinctures of orris, 2 kilos; musk, 30 Gm.; civet, 30 Gm.; otto of roses, 20; oil of ylang-ylang, 60 Gm.

Stephanotis: Extracts of orange, 1 kilo; rose, 1 kilo; jasmin, ½ kilo; cassia, ½ kilo; tinctures of orris, ½ kilo; musk, 20 Gm.; oils of rose, 5 Gm.; lemon, 1 Gm.

Hyacinth: Spirit, 3000; distilled water, 300; extract of jasmin, 500; tinctures of benzoin, 100; musk, 50; oil of neroli, 10; hyacinthin, 60 Gm.

Chypre (English): Extracts of jasmin, 2 kilos; rose, 2 kilos; tubéreuse, 2 kilos; tinctures of ambrette, 2 kilos; orris, 1 kilo; musk, 500; civet, 200; tonka, 300; benzoin, 500; vanilla, 100; oils of bergamot, 20; rose, 50; patchouli, 10; sandalwood, 5; rose geranium, 15 Gm.

New-mown Hay: Spirit, 2500; benzoic acid, 5 Gm.; oils of patchouli, 2; lavender, 5 Gm.; rose, 4 Gm.; neroli, 5 Gm.; bergamot, 10 Gm.;

musk tonquin, 5 Gm.; vanillin, 20; orris powder, 150; tonka beans (cut up), 100 Gm.

Chypre (German): First extracts of jasmine, 2; rose, 2; tubéreuse, 4; tinctures of Abel musk, 1; orris, 2 kilos; musk, 500; civet, 200; cumarin, 5; heliotropin, 10; vanillin, 5; oils of bergamot, 20; rose, 20; patchouli, 10; sandalwood, 5; rose geranium, 40 Gm.

Elder Blossom: Spirit, 8000; distilled water, 2000; oil of ylang-ylang, 70; cumarin, 45; terpineol-muguet, 250; musk Bauer, 5 Gm.

Violet: First extracts of violet, 6; cassia, 3 kilos; orange water, 250; tincture of musk, 15; oils of bergamot, 250; geranium (Afr.), 15; ionone, 15 Gm.

Elder: Extracts of jasmine, 6; orange, 2; rose, 1½; tubéreuse, 1; cassia, ½ kilo; tinctures of musk, 15; heliotropin, 15; terpineol, 125; oils of roses, 5; neroli, 45; rose-water, 1000 Gm.

Perfumes—New Formulas.—The "Pharmaceutical Journal" (March 26, 1898, 302) publishes the following formulas for some perfumes for the benefit of those who have become interested in the subject of "Perfumery for Pharmacists," as presented in another article (see *Essentail Oils used in Perfumes*, under "Organic Chemistry"):

Essence of White Clover.—Vanillin, 20 grains; heliotropin, 20 grains; coumarin, 20 grains; tincture of storax, ½ ounce; tincture of civet, ½ ounce; tincture of orris, 1 ounce; otto of rose, 60 minims; oil of bergamot, 60 minims; oil of neroli, 90 minims; extract of tuberose, 4 ounces; extract of jasmin, 8 ounces; oil of cloves, 5 minims; oil of bitter almonds, 5 minims; terpineol, 60 minims; rectified spirit, 8 fluid ounces; glycerin, 1 fluid drachm.

Essence of Crab Apple.—Hyacinthin, 5 minims; cratægin, 10 grains; oil of ylang-ylang, 30 minims; volatile oil of nutmeg, 10 minims; oil of lignaloe, 20 minims; oil of wintergreen, 2 minims; musc baur, 10 grains; extract of cassie, 2 fluid ounces; extract of violet, 4 fluid ounces; tincture of orris, 1 fluid ounce; glycerin, 30 minims; extract of jasmin, 4 fluid ounces.

Essence of White Iris.—Ionone, 3 minims; oil of orris, 10 minims; heliotropin, 30 grains; terpineol, 60 minims; oil of ylang-ylang, 20 minims; oil of lignaloe, 5 minims; solution of amyl acetate, 10 per cent., 5 minims; glycerin, 20 minims; essence of jasmin, to make 10 fluid ounces.

Essence of White Violet.—Ionone, 60 minims; musc baur, 10 grains; essential oil of orris, 10 minims; extract of violet, 18 fluid ounces; extract of rose, 2 fluid ounces; oil of sweet orange, 5 minims; oil of neroli, 5 minims; tincture of orris, 4 fluid ounces; heliotropin, 30 grains; terpineol, 5 minims; solution of oil of patchouli (1 in 10), 20 minims; glycerin, 30 minims.

Essence of Wallflower.— Essential oil of orris, 2 minims; oil of sweet orange, 1 minim; heliotropin, 5 grains; oil of neroli, 2 minims; extract of orange, 2 fluid ounces; extract of tuberose, 2½ fluid ounces; extract of jasmin, 15 fluid ounces; coumarin, 3 grains; glycerin, 30 minims; oil of bitter almonds, 5 minims.

Essence of Heliotrope.—Heliotropin, 30 grains; essence of jasmin, 4 ounces; oil of ylang-ylang, 5 minims; oil of bitter almonds, 2 minims; cratægin, 1 grain; oil of neroli, 10 minims; oil of lignaloe, 30 minims; terpineol, 10 minims; otto of rose, 5 minims; rectified spirit, 10 fluid ounces.

Essence of White Lilac.—Terpineol, 3 drachms; heliotropin, 30 grains; extract of rose, 2 fluid ounces; oil of ylang-ylang, 10 minims; extract of jasmin, 4 fluid ounces; rectified spirit to produce 20 fluid ounces.

Essence of Lily of the Valley.—Extract of tuberose, 6 ounces; extract o jasmin, 8 ounces; tincture of civet, 1 ounce; oil of lignaloe, 30 minims; terpineol, 10 minims; oil of sweet orange, 2 minims; heliotropin, 20 grains; oil of neroli, 3 minims; glycerin, 20 minims; tincture of chlorophyll, 30 minims; extract of rose to produce 20 fluid ounces.

Essence of Narcissus.—Caryophyllin, 10 minims; extract of tuberose, 16 fluid ounces; extract of jasmin, 4 fluid ounces; oil of neroli, 20 minims; oil of ylang-ylang, 20 minims; oil of cloves, 5 minims; glycerin, 30 minims; solution of amyl acetate, 10 per cent., 20 minims.

Essence of Wood Violet.—Ionone, 10 minims; extract of violet, 18 ounces; extract of cassie, 4 fluid ounces; extract of jasmin, 4 fluid ounces; tincture of orris, 10 fluid ounces; tincture of musk, 20 minims; otto of rose, 5 minims; glycerin, 30 minims.

Sticky Fly Papers—Composition.—The "Pharm. Centralhalle" (xxxviii., 448), gives the following condensed formula for preparing sticky fly papers:

Resin	550	500	650	600	500
Linseed oil	350	300	—	—	—
Castor oil	—	—	350	300	340
Honey	100	200	—	100	—
Glycerin	—	—	—	—	160

Melt together and smear on paper while warm. The addition of strong decoctions of pepper or quassia chips or emetic tartar to the honey kills the flies quicker.

Saponaceous Cleansing Compound—Formula.—J. F. C. Müller has patented in England a cleansing compound, which is recommended as being specially suited for cleaning ceiling paintings and oil-paint work in general, without damaging the object. It is made as follows: Five kilos of oleic acid are saponified with 1½ kilos of caustic soda, 1½ of potassium carbonate, and 3 or 4 liters of water. 25 kilos of Iceland moss are made into a mucilage with the smallest possible amount of water, mixed with 5 kilos of "linseed mucilage produced by boiling," and 125 Gm. of salicylic acid added as an antiseptic; the whole being finally incorporated into one.—Merck's Rep., Aug. 15, 1897, 496; from Jour. Soc. Chem. Ind.

Furniture Polishes—Various Formulas.—Leon L. Walters calls attention to furniture polishes and creams as being a profitable specialty for pharmacists to manufacture, and he communicates the following formulas, any one of which produces a good article. An "all around" satisfactory preparation is the so-called

"*Chemical Polish:*" Linseed oil, 40 parts; alcohol, 4 parts; vinegar, 16 parts; antimony chloride, 2 parts; ammonium chloride, 1 part; spirit of camphor, 1 part. Place the oil in a large bottle, and add successively the antimony chloride, the spirit of camphor, the vinegar and the alcohol, part by part, and with constant shaking; when thoroughly incorporated add the sal ammoniac.

A simpler formula, which has been tried with satisfaction during the last four years, is the following: Boiled linseed oil, 4 pints; alcohol, 2 pints; turpentine (oil) 1½ pints; solution of antimony terchloride, 10 drachms. To the mixture of the oil and turpentine, the antimony terchloride dissolved in the alcohol is added, little by little, shaking after each addition.

Acid Polish is made by the following formula: Boiled linseed oil, 3 ozs; alcohol, 5 ozs; hydrochloric acid, 2 drachms; red saunders, sufficient to color. This mixture, which should be shaken before being used, is widely used as a renovating polish.

Furniture Cream.—Pastes and creams, on account of their cleanliness and ease of application, are becoming quite popular. A good formula is the following: White soap, 2½ ozs.; spir. turpentine, 80 ozs.; white wax, 20 ozs.; water, 110 ozs., potassium carbonate, 1 oz. Place the soap in a water-bath with a portion of the water, and melt by a gentle heat, adding the remaining water as fast as absorbed. Now add the wax and increase the heat until it melts. Reduce the heat and add the turpentine gradually, stirring until all is thoroughly incorporated. This produces an elegant article, which sells rapidly and gives even satisfaction. It should be put up in 1½ or 2-ounce ointment jars, properly labeled.—Pharm. Ztg., Sept. 15, 1897, 177.

Dull Black Varnish—Formula.—G. E. B., in "Photo. News," states that a useful varnish for blacking the interior of lantern bodies, lens tubes, etc., is made by mixing vegetable black or gas black with lacquer or French polish. Too much lacquer gives a shiny surface; too little fails to make the black adherent. To ensure a smooth mixture, free from lumps, it is recommended to place a few shot in the bottle containing the varnish and to shake up before use.—Pharm. Journ., May 21, 1898, 504*a*.

Black Leather Varnish—Preparation.—The following formula for a black leather varnish is given in "Farb. Ztg." Into a spacious glass flask pour 4 liters of spirit; to this add, somewhat reduced, 150 Gm. of the finest shellac, 50 Gm. of sandarac and 20 Gm. of mastic, and dissolve completely, shaking frequently. To this still brittle varnish add 100 Gm. of pure Venetian turpentine. When the whole has dissolved uniformly clear, it is dyed deep black with nigrosine (aniline black) soluble in spirit or in water. For this purpose lampblack is also recommended. The varnish should always be kept well closed up, and if it should thicken in time, owing to the spirit evaporating, it can be diluted again with spirit. The process can, of course, be carried out on a larger scale.—Amer. Drugg., Jan. 25, 1898, 35.

Invisible and Sympathetic Inks—Convenient Preparation.—J. Rutherford Hill, unable to find any satisfactory information in works of reference concerning "invisible inks," resorted to a solution of mercurous nitrate, which on exposure to ammonia fumes, produces black mercurous nitrate, with good results. On writing with such a solution, by means of a quill, on ordinary white paper, the writing, when dry, is invisible. If then the paper is exposed for a few moments to the fumes of ammonia, by placing it inside of a cylindrical jar, the bottom of which is covered with strong ammonia solution, and then withdrawing it, the writing becomes distinct and permanently black.

A "sympathetic ink" that meets all requirements is found by the author in a fairly strong solution of phenolphthalein. Writing with such a solution on ordinary white paper is quite invisible when dry, but when placed for a few seconds into the jar containing ammonia vapor, the writing appears of a beautiful pink color, and fades and disappears again as the ammonia evaporates, or almost immediately by breathing upon the paper.—Pharm. Journ., April 30, 1898, 413.

Invisible or Chemiographic Ink — Preparation. — According to Gawolouski, a chemiographic ink of the following composition is used for secret dispatches, etc.: Dissolve lead acetate, 1.0; uranium acetate, 0.1; bismuth citrate, 1.0; distilled water, 100.0. Add carefully a few drops of ammonia until the solution becomes clear. Then add a few drops of gum arabic or sugar. Characters written with this ink are quite invisible until they have been subjected to fumes of sulphuretted hydrogen, when they appear immediately as brownish-black. After a few minutes the characters fade to light brown; if moistened with highly diluted nitric acid they are regenerated and become quite clear again. — Pharm. Post, 1897, 534.

Rubber Cement—Various Formulas.—The following formulas are given in "Scientific American" from "Färber Zeiting," and appear to cover a large field of usefulness of rubber cement very completely:

Gutta Percha Cement for Leather, to be applied hot.—Melt together 100 parts gutta percha, 100 parts asphalt or pitch, and 15 parts oil of turpentine.

Elastic Gutta-Percha Cement.—Dissolve 10 parts of gutta-percha in 100 parts of benzin and pour the solution into 100 parts of linseed oil varnish, shaking well. This is especially useful for fixing soles to shoes, as it does not crack on bending. The leather must be roughened before applying the cement.

Rubber Cement.—This is made by dissolving shellac in ten times its weight of ammonia. After standing for three or four weeks a transparent putty results, which is used without heating. It is a good cement for fastening rubber on metal, and is water tight.

Cement for Leather Belting.—This is obtained by heating gutta percha with a mixture of 10 parts of carbon disulphide and 1 part of oil of turpentine until a thick paste results. The leather to which this cement is applied must be unoiled and roughened.

Caoutchouc Cements are made as follows: 100 parts finely cut caoutchouc, 15 parts resin, and 10 parts shellac are dissolved in carbon disulphide. Or, 1 part caoutchouc and 7 parts of mastic are allowed to stand several weeks with 50 parts of chloroform. A

Cement for Rubber Boots, etc., is made by dissolving 10 parts of caoutchouc in 250 parts of chloroform; then dissolve another portion of 10 parts of caoutchouc and 4 parts of resin in 40 parts of oil of turpentine. For use, pour together equal parts of both solutions.—Amer. Drugg., Jan. 10, 1898, 8.

MATERIA MEDICA.

A. Vegetable Substances.

GENERAL SUBJECTS.

Botanical Nomenclature—Advantage of Common Names of Plants for their Identification.—Referring to an opinion expressed by Professor Kraemer at a pharmaceutical meeting of the Philadelphia College of Pharmacy (March 1898), that the common names of plants are less confusing than their botanical names, Professor John Uri Lloyd adds his testimony in support of this view, based upon his experience in a commercial way with some plant names. He had at one time strenuously advocated the use of botanical names only; but subsequent experience made it necessary not only to acquiesce in the use of certain common names, but to publicly advocate them, in the price lists of his firm, and otherwise. There must, however, be a discriminating selection of common names, for the use of some such as Indian Hemp, Willow Herb, &c., in their turn create confusion. In his experience common names should be applied to the following drugs:

"Asthma Weed," for *Euphorbia pilulifera*—to distinguish it from other species of *Euphorbia*.

"Black Haw," for *Viburnum prunifolium*—to distinguish it from *V. opulus*.

"Fragrant Sumach," for *Rhus aromatica*—to distinguish it from *R. Toxicodendron*.

"Gravel Root," for *Eupatorium purpureum*—to distinguish it from *E. perfoliatum*.

"Horse Chestnut," for *Æsculus Hippocastanum*—to distinguish it from *Æsculus glabra*.

"Spikenard," for *Aralia racemosa*—to distinguish it from *A. nudicaulis*.

"Spotted Sponge," for *Euphorbia hypericifolia*—to distinguish it from *E. corollata* and *E. pilulifera*.

"Swamp Milkweed," for *Asclepias incarnata*—to distinguish it from *A. cornuti* and *A. tuberosa*.

"White Snake Root," for *Eupatorium aromaticum*—to distinguish it from *E. perfoliatum* and *E. purpureum*.—Amer. Jour. Pharm., May, 1898, 234–235.

Powdered Vegetable Drugs—Qualitative and Quantitative Microscopic Examination.—Henry Kraemer observes that powdered drugs and "pressed herbs" will, no doubt, at a not very distant day, be the form in which most of the vegetable drugs will be bought and sold by the apothecary. This innovation has its advantages as well as disadvantages; but the advantages evidently determine the use of powdered drugs, and it is therefore in order that the disadvantages may be rendered as harmless as possible. It is with this view doubtless that the author has endeavored to devise a scheme for the microscopic examination of powdered vegetable drugs, both qualitatively and quantitatively, which shall permit the rapid discrimination and study of the characteristic tissues and contents of the powder. He has further, and somewhat more satisfactorily, developed his method for securing approximate quantitative results of the examination of a powder by means of the microscope, preliminary notice of which was given in a paper presented to this Association in 1894 (see Proceedings 1894, 159–165). By the methods given in the present paper, to which reference must be had for details, approximate quantitative results may be obtained in the examination of unknown powders. Indeed, there are some cases where the quantitative determination of admixtures and adulterations, if they are to be determined at all, can be done so only by means of a microscopical method.—Amer. Jour. Pharm., Oct., 1897, 523–533.

Powdered Drugs—Detection of Adulterants.—Dr. H. H. Rusby has prepared a useful report as Chairman of Research Committee C to the Committee of Revision of the U. S. P., on the detection of adulterants in powdered drugs. The report considers and briefly reviews the observations of different members of the Committee: Dr. Albert Schneider, on ipecac, eucalyptus, senna and mace; Prof. L. E. Sayre, on Alexandria and India senna; Prof. Grace E. Cooley, on sambucus; Miss Katharine C. Burnett, on sassafras; and F. G. Hills, on quassia. The report may be consulted with advantage in Drugg. Circ., July, 1897, 185.

Powdered Drugs.—Microscopical Characteristics.—Prof. S. E. Jelliffe gives a concise description, illustrated by numerous drawings, of the microscopical elements that may serve for the identification of certain well-known drugs, of which the following is a brief summary:

Colchicum.—The general elements in the powdered corm are starch, ducts, and parenchyma, the starch predominating.

Aconite.—In the powdered tuber the following constituents are recognizable: Starch, parenchymatic tissue, cork cells, stone cells, endoderm cells, tracheids, ducts, sometimes a few wood fibres, and also a few epidermal hairs.

Squill.—The chief microscopical elements of the powder are crystals, parenchymatic tissue, epidermal cells, with few stomata and spiral vessels. Starch is absent, though at certain times the vessels contain a few small starch grains.

Jalap.—The more prominent microscopical constituents are starch, ducts, crystals, tracheids, resin cells, and parenchyma.

Rhubarb.—The following microscopical elements are usually found: Crystals, starch, peculiar needles of chrysophanic acid (?), parenchyma, vessels, and fibres.

Senna.—The following elements enter into the composition of the powder: Hairs, crystals, parenchyma, chlorophyll grains, stomata and the constituents of the midribs and veinlets, fibres and spiral or annular vessels, and occasionally filled ducts.

Jaborandi.—In the powder may be identified: Leaf epidermis with stomata, leaf mesophyll, fibrous tissues from the midribs and peticles, oil glands, crystals, starch, hairs, and sometimes stone cells.—Drugg. Circ., Dec., 1897, 35, Jan. and Feb., 1898, 7 and 21.

Histology of Drugs—A Series of Highly Interesting Papers.—Alfred R. L. Dohme has contributed in the past a number of highly interesting papers on the pharmacognosy and histology of pharmacopœial and other drugs, and has continued the series in the "Druggists Circular," beginning with the July number, 1897. In these papers he considers the origin of the drugs, their general characteristics and histology, accompanied by numerous illustrations illustrative of the text, together with the chemical properties and characters of their constituents. The drugs considered are the following in the chronological order of the papers. July, 1897:

Dandelion, gentian, eucalyptus, conium (seed), gelsemium and in this connection false gelsemium *(Jasminum fructicans)* and mandrake. August, 1897: Licorice, arnica (root), and turpeth *(Ipomœa turpethum)*. September, 1897: Lobelia, senega, columbo, and quillaja. October, 1897: Bittersweet *(Solanum dulcamara)*, and marshmallow. December, 1897: Quassia and pomegranate (bark). February, 1898: Savin, and cascara sagrada. April, 1898: Male fern and ergot. The histological characters as given by the author, are briefly as follows:

Taraxacum.—In cross section the root shows a rather small layer of cork cells, and below this quite a large cortical parenchyma made up of parenchyma cells and a series of concentric layers of milk-sap ducts and sieve-ducts. These are invariably almost commingled, each patch of them consisting about half of milk-ducts and half of sieve-ducts. The indurated or woody cylinder inside of the cortical parenchyma is practically continous and irregular, and the parenchyma cells penetrate it as irregular medullary rays at many places.

Gentian.—In cross section the cork cells are seen to be rather slight in number and size, and usually show some phlobophanes or coloring matter; the cortical parenchyma is rather contracted and small, but swells considerably when the root is soaked in water. The cells near the cork cells are rather round, and gradually get smaller and more rectilinear as they approach the cambium, which appears as a dark line running around the section. The cortical parenchyma is thickly interspersed with patches of sieve-ducts. Below the cambium the yellow-walled duct cells or xylem are situated irregularly among the parenchyma and medulla cells, and are often accompanied by sieve-ducts or phloem. It is hence difficult to locate any medullary rays. The stiffness of dried gentian reot is attributable to the large number and size of the tracheotic ducts or xylem of the woody portion.

Eucalyptus.—In cross section eucalyptus leaf shows numerous oil cells throughout its area, also side ribs and a peculiar shape of the duct system, curved upon itself. The palisade parenchyma occurs upon the upper and lower sides of the leaf. Around the fibro-vascular or duct system is found the usual collenchyma.

Gelsemium.—In cross section gelsemium root shows the ordinary cork cells and cortical parenchyma. The phloem and xylem also are both normal, and as wedges occur very close together, giving the root great hardness and stiffness. Curiously enough, the pith or medulla contains indurated cells, which is almost characteristic, microscopally speaking, for the drug.

Mandrake.—In cross section the rhizome of mandrake shows nothing unusual. An ordinary thin epidermis, regular cortical parenchyma containing isolated fibro-vascular bundles, and then a woody cylinder rather irregularly arranged. Below this, and connected with the medullary rays, is the usual medulla.

Licorice.—In cross section the root shows the following peculiarities: The usual cork cells and cortical parenchyma, the cells of the latter being full of starch grains. Scattered through the cortical parenchyma are bundles of bast fibres, which are yellow in color and carry the resinous matter of the root. They are frequently accompanied by ducts containing crystals of calcium oxalate, and often show some very pretty monoclinic crystals. Between the cortical parenchyma and the woody cylinder we find the periderm or inner cork cells, and below this the medullary rays and woody wedges containing the phloem and xylem. These wedges are usually capped with bast fibres and their phloem is usually accompanied by straws of defunct or dead sicor ducts.

Ipecac.—In cross section ipecac root shows a rather small layer of cork cells and an extensive cortical parenchyma, which is full of starch, and contains most of the alkaloids. The woody portion contains little or no alkaloids. Below the cortical parenchyma is the well-developed woody cylinder, made up of tracheotic ducts and heavy indurated or ligniform cells. It contains neither medullary rays nor medulla. It contains a very small percentage of an unpleasantly smelling ethereal oil, two alkaloids, emetine and cephaëline, choline and a peculiar tannic acid called ipecacuanhic acid, until we know more about it.

Lobelia.—In section the stem shows an epidermis of indurated cells, sometimes with excrescences or bristles like those on the leaves. Below the epidermis is the cortical parenchyma, and under this the phloem as a band around the woody cylinder, which is directly below it. The xylem is quite pronounced and well developed and gives the stem great stiffness. The medullary rays run through the xylem to the medulla beneath.

Senega.—The cross section of senega root is very irregular, so that one seldom gets two that are alike, for due to the strong and uneven contraction during the process of drying, the woody cylinder as well as the cortical parenchyma are contorted and twisted. In the section shown in the author's paper the cortical parenchyma extends all around the woody cylinder, which has become turned about so that the medullary cells are on the outside and the phloem on the inside of the libriform or woody cylinder. There is very often a cambium, but not in this section. The oil of senega is found in the cortical parenchyma, as is also the polygalic acid and senegin.

Columbo.—In cross section the root shows a very contorted cork layer, and in the cortical parenchyma below this a series of stone cells of a decidedly yellow color and possessing coarse-grained walls. They form a complete circle around the root and occur usually singly, but sometimes in groups. The phloem is present in the cortical parenchyma, running sinuously through the same. The cambium zone is small and of a brownish-yellow color, and separates the cortex from the inner root, which consists mainly of parenchymatic cells. The woody portion of the root is quite limited in extent, and consists of irregularly combined series of tracheotic ducts, running generally in a series towards the centre of the root. These ducts are highly colored, of a yellow color, and extend all the way to the center of the root, which hence possesses but little pith or medulla. The whole parenchyma, both cortical and inner, is full of starch grains of a round to oval shape, and of a large size, being perhaps the largest known next to those of the potato. Jalap and zeodary root have starch grains about as large as those of columbo.

Quillaja.—The bark shows in cross section a regular arrangement of its tissues, the parenchyma being divided off symmetrically by the medullary rays, which are usually four-celled. Between these are seen the phloem in groups and the bast fibers, which are frequently accompanied by ducts containing clusters, and at times large crystals of calcium oxalate. Spread throughout the section are crystals of all shapes and aggregates of crystals of calcium oxalate. Among the starch grains with which the section is filled are small grains or lumps of a substance which has been found to be saponin, as they dissolve in concentrated sulphuric acid forming a yellow solution, which changes to red and finally to violet.

Bittersweet.—The stems, in cross section, show a thin cork layer, under this a large-celled primary bark, interspersed with bast fibers, and under this the smaller-celled secondary bark, from which emanate the medullary rays, which are numerous and extend through the cambium to the medulla. Below the secondary bark is the cambial zone and below this the woody portion, consisting of the tracheotic ducts and tracheides forming the first and second annular rings. Below the first annular rings are the sieve-ducts or phloem, which generally also contain some bast fibres. Below this, arranged in a sort of semi-circular ring running from one medullary ray to another, is the medulla.

Marshmallow.—In cross section the root shows the usual cork cells, and below these a cortical parenchyma, containing considerable starch and calcium oxalate crystals and clusters of bast fibres. These fibres are quite white and much resemble those of cotton. There are also the characteristic mucus-secreting cells, some full and some empty. The medullary rays extend through the cambium up into the cortical parenchyma. Curiously enough, the phloem cells are situated close to the cambium but in the cortical parenchyma, and thus separated from the xylem. The woody portion contains the tracheotic ducts, with their accompanying tracheides or ligniform, some mucus-secreting cells and calcium oxalate crystals. The entire root is of course gorged with small starch grains. The cortex is usually slightly yellow in color, notably the bast fibres.

Quassia.—The wood is derived from two kinds of trees, the one *Quassia amara*, the other *Picræna excelsa*. The medullary rays in the cross section of the wood of *Quassia amara*, are thinner than those of *Picræna excelsa* wood, and the tracheotic ducts do not ever fill out the entire space between the medullary rays. In the case of *Picræna excelsa*, the tracheotic ducts do very frequently fill up the entire space, and in general the cells are larger than in *Quassia amara*. The cross sections of both are made up of rows of medullary rays, between which in alternating layers are found indurated woody cells, and non-indurated parenchyma cells. Irregularly scattered among them are all the tracheotic ducts, larger in case of *picræna* than those of *quassia*.

Pomegranate.—The root-bark shows in cross section very little difference from the bark of the tree, and there is nothing unusual except the regularity of the wedge-shaped wooden cylinders separated by minor bi-cellular medullary rays. The cortical parenchyma is full of starch and calcium oxalate, and the woody cylinders are also full of the latter. In the primary bark, which is not given here (this being secondary bark), being below the cambium, there are found groups of stone cells, but seldom if ever in the secondary bark.

Cascara.—The bark, in cross section, shows a well-developed series of cork cells. and below these a cortical parenchyma, consisting of good-sized parenchyma cells, which contain crystals and crystal aggregates of calcium oxalate, patches of bast fibres and aggregates of characteristic stone cells (seeds). From this cortical parenchyma extends the woody cylinder, made up of small cells, libriform, more or less indurated in alternate patches, and separated into longitudinal strips by the medullary rays, usually bi-cellular. The cortical parenchyma, as outlined above, is sometimes termed the middle bark, the woody cylinder of libriform cells being the inner bark and the cork layer of cells the outer bark.

Savin.—The leaves present nothing especially unusual, except perhaps the peculiar square cells around the fibro-vascular bundle, which are thickened towards the inside. The leaves occur singly or doubly, being in that case opposite and connected. The junction is in the line of the two indentations, and the fibro-vascular bundle is common to both. Each of the two contains its large oil cell. The epidermis cells are as usual, and breathing cells occur on all sides of the leaf. Below the epidermis are seen the palisade parenchyma cells, and below these, making up the rest of the leaf, is the soft spongy parenchyma. The oil reservoirs or cells are surrounded or lined by slightly indurated cells, and are quite large. The fibro-vascular bundle contains the usual xylem and phloem, the former arranged somewhat in the shape of a half Maltese cross, and both are surrounded by the peculiar, almost characteristic, indurated square or oblong cells, which are indurated towards the centre in lumps or patches, apparently to strengthen and protect the bundle.

Male Fern.—In cross section the root presents below the usual epidermis a layer of specially indurated lignified parenchyma cells, and below this the usual soft parenchyma, well filled with starch grains and containing, well scattered throughout, the oleo-resin-secreting cells containing the glands that secrete, but not especially lined or marked in any way. Throughout the parenchyma, isolated and of varying size and shape, are fibro-vascular bundles, enclosed in an endodermis covering of indurated cells. Below the endodermis we see the phloem, and below this as a core the xylem, consisting of woody indurated stiff cells.

Ergot.—In cross section ergot shows but little of interest, consisting of a rim of coloring matter cells, enclosing an uninterrupted series of hyphæ interspersed with cells containing oil and other secretions. The white cells are the hyphæ and the smaller darker cells are the oil and secretion cells, from which, however, in a microscopic section, the oil, etc., has been removed. The hyphæ in case of all the fungi get so close together and are so continuous that they simulate the parenchyma of plants, and the body of an ergot grain is hence generally considered to be made up of pseudo-parenchyma. This pseudo-parenchyma is best developed in case of ergot and is in a measure characteristic of the same.

Examination of Organic Drugs—Importance of Ash Determination.—D. B. Dott directs attention to the importance of ash determination in examations of organic drugs, such determination serving either for the purpose of identifying the species of plant or the variety of drug from which powders are derived, though the usefulness of the method is limited by the fact that in many cases the mineral matter varies greatly with the conditions of cultivation, soil, etc., or, where the amount of ash exceeds the maximum, or is below the established minimum in detecting adulteration. The process of incineration is, however, frequently carried out imperfectly, and the author makes some suggestions in this direction that will be profitably consulted. Among them the introduction of oxygen to facilitate the complete combustion of the carbon is suggested, the oxygen being conveniently derived from hydrogen dioxide by the action of granular binoxide of manganese. As to crucibles, while platinum answers best in most cases, the presence of certain compounds, such as the salts of readily reducible metals—silver, lead, and even copper—potash, soda and their nitrates, etc., render them unsafe to use, and he therefore considers porcelain crucibles on the whole to be most desirable to use. These also are not free from defects, being difficult to heat through, and liable to crack. Mr. Dodd gives several examples of ash determinations, which show the importance of such in the examination of drugs.

Opium is stated to yield from 4 to 8 per cent. of ash calculated for the dry substance; 7.51 per cent. was found in a sample of Turkey opium, and 5.85 per cent. in a sample of Persian.

Lobelia is a drug about which there appears to be nothing authoritative concerning its ash content. In a commercial sample of powder, 11.85 per cent. of ash was found, while some lobelia powdered for the purpose gave 12.58 per cent.

Rhubarb Root is a substance in which the amount of inorganic matter varies widely. The percentage of ash from English rhubarb was found by Boris to vary from 8 to 11 per cent. and in East India rhubarb from 20 to 25 per cent. Mr. Dodd found in a sample, said to be East Indian, 9.25 per cent., and in two samples of English rhubarb 6.95 and 8.8 per cent., while a sample grown in Scotland gave 7.35 per cent.

Saffron is very liable to adulteration, and in this case the ash is an important criterion of purity. The B. P. gives the ash as about 6 per cent. In two evidently genuine samples, Mr. Dodd found 5.12 and 5.16 per cent. and in several undoubtedly adulterated samples, 17.0, 22.59 and 31.80 per cent. of ash. In one sophisticated sample, however, he found less than the right percentage, viz, 3.8 per cent.

Honey is stated by the B. P. to yield not to exceed 0.2 per cent. of ash, while Allen gives 0.1 to 0.25 per cent. Mr. Dodd found a genuine sample to contain 0.24 per cent., while an adulterated sample yielded only 0.01 per cent.; but this ash gave a marked sulphate reaction, indicating probably that the honey was mixed with very pure glucose.

Indigo always contains inorganic matter to the extent of 5 or 6 per cent. One sample examined contained 49.39 per cent., largely iron and calcium, another gave 32.07 per cent.—amounts that are unpardonable.

Silk is often weighted with inorganic salts, so much as 30 per cent. of ash being found. Some silk sutures used by surgeons were found to yield 1.31 per cent. of ash, which is within the limit of purity, and quite satisfactory.—Pharm. Jour., March 19, 1898.

Vegetable Drugs—Determination of Ash.—Dr. J. Hockauf has determined the ash in a large number of powdered drugs, with the results shown in the table following. The total ash was treated with hydrochloric acid to give the quantity of silicious matter present. The percentages are calculated on the basis of the air-dry weight of the drug. In the course of the study many interesting facts were encountered. In the residues undissolved in HCl, silicious skeletons of certain elements were found, these often being beautifully demonstrable under the microscope. In abnormally large silicious residues the presence of sand was generally demonstrated as adulterant or as a result of insufficient cleaning of the drug. The color of the ash was found to vary greatly.

Name of Drug.	Total Ash.	Ash insol. in HCl.
Hyoscyamus leaves	14.5–35.7–72 p. c.	2.5–53.25 p. c.
Belladonna leaves	10.5–15 “	0.8–2.15 “
Stramonium leaves, select	20.3–21.3 “	2.87–2.45 “
Digitalis leaves	8.1–9.6 “	0.1–1.85 “
Salvia leaves	7.9–18–60 “	0.6–6.8–17.7 “
Mentha piperita leaves	10.0–16 “	0.3–2.0 “
Coca leaves	5–11.55 “	1.5–2.7 “
Orange leaves	15.75 “	2.2 “
Senna leaves	10–11.5 “	0.4–1.8 “
Cannabis Indica, select	13.14 “	1.73 “
Melilotus	9.0 “	——
Marjoram herb	12.5–19 “	——
Satureija herb, select	11.227 “	0.656 “
Thyme herb, select	8.5 “	2.3 “
Absynth herb	17.0–21.8 “	5.9–10.36 “
Sabina herb	5.0–7.3 “	0.2–0.7 “
Conium herb	12.0–8.0 “	——
Crocus stigmas	3.05–5.31–18.4 “	0.26–15.76 “
Calendula flowers	8.7–9.13 “	1.18–1.11 “
Carthamus flowers	5.6 “	1.1 “
Sandal wood	2.0 “	——
Cloves	4.0–6.9 “	0.25–0.60 “
Black pepper fruit	3.73–3 88 “	0.13–0.34 “
Penang pepper, poor	5.06 “	0.73 “
Cubeb fruit, select	5.85–8.12 “	0.09–0.39 “
Allspice fruit, select	3.9 “	0.03 “
Anise fruit, select, whole	6.23 “	0.45 “
Anise fruit, powdered, commercial	11.0–43.8 “	3.6–32.8 “
Fennel fruit, whole, select	8.94 “	0.24 “
Fennel fruit, powdered, commercial	8.8–15.6 “	0.8–6.35 “
Caraway fruit, select, whole	6.1 “	0.125 “
Cumin fruit, whole, select	7.5 “	0.3 “
Coriander fruit, whole, select	6.85 “	1.05 “
Star anise fruit, whole, com.	2.98 “	0.17 “
Star anise fruit, powdered, com.	3.5–8.5 “	0.1–1.3 “
Nux vomica seed, powdered	2.0–8.4 “	0.5–2.0 “
Cinnamon bark, powdered	2.45–11.35 “	0.1–7.85 “
Ceylon cinnamon bark, select	3.94 “	0.03 “

—Pharm. Rev., April, 1898, 152 ; from Ztschr. Œst. Apoth., 52, 1 and 25.

Domestic Crude Drugs—Inferiorities that May be Observed in them.—Prof. D. M. R. Culbreth, whose close business relations for many years with one of the houses that make crude drugs a feature, and where he was at any and all times granted privileges in examining and garbling such drugs, has written an admirable paper, in which, after discussing the sources, conditions of care in selection, collection, storing and preservation of crude domestic drugs, he describes what may be expected in an examination of these drugs as marketed, as follows :

Cimicifuga (From Maryland, North Carolina, South Carolina, Virginia).—Owing to its characteristic dark color, adulterations are easily recognized, hence are well guarded against. We usually however find caulophyllum and podophyllum to the extent of about 1 per cent. each, also sometimes a few pieces of comfrey, which well imitates the blackish color.

Hydrastis (From North Carolina, South Carolina, Georgia, West).—This having but slight odor, and a yellow color upon fracture, is easily recognized. That coming from the south generally contains a small percentage of aristolochia serpentaria, and that from the west a larger amount of aristolochia reticulata. When in number 20 to 30 powder, xanthorrhiza is sometimes added to cheapen and to preserve the color.

Podophyllum (From North Carolina, South Carolina, Georgia, West).—Roots and rhizomes containing much resin are surprisingly heavy, considering their appearance, and break with an elastic but short fracture, giving more or less noise. We have podophyllum as "thick," "thin," "heavy" and "light." The chief admixture is bloodroot (owing to a similarity of leaves often misleading the collector) which usually occurs to the extent of 2 to 3 per cent. Sometimes that much geranium is found, and a little comfrey. The fall collection is always preferred, as it is heavier from containing more resin, and breaks with a cleaner fracture.

Bloodroot (From Virginia, North Carolina, South Carolina, Tennessee).—This is recognized externally by its characteristic shape and reddish-brown color, and internally by its bloody-red center upon fracture. It is adulterated chiefly with geranium (1 to 2 per cent.) which has a very rough exterior, and a white center upon fracture, unless oldish when it may become pinkish, but not near so dark a red as bloodroot. Sometimes we find also small amounts of podophyllum and comfrey.

Geranium (From Virginia, North Carolina, South Carolina).—This usually comes in clean, as its most likely admixture, bloodroot, being higher priced, is closely taken out. Several 50-pound bags yielded about 2 per cent. of bloodroot, also geranium stems and leaves, with a little podophyllum and comfrey. Fresh geranium root should give a brittle fracture, but it is sometimes pliant; it should also have a whitish center, which in old samples may become pinkish.

Senega (From Maryland, South, Minnesota, St. Louis, Texas).—Six bags examined proved to be exceptionally clean, but contained small quantities of bloodroot, may-apple and poke root. Sometimes the false or white varieties (polygala alba and p. boykinii) are mixed with it, which having a brighter yellow color, are sometimes broken in small pieces, when they are difficult to detect.

Wild Cherry (From Virginia, North Carolina, South Carolina, Maryland).—This should be "rossed," hence consists only of the inner bark, the outside epidermis (ross) being removed. That done, the outside should be green, the inside yellowish-brown, the fracture very brittle. To this is sometimes added the unrossed bark and that of old stems, also the bark of the choke-cherry (prunus virginiana), which resembles in appearance the official but as a rule is thinner or thicker, and breaks with a very tough fracture like slippery elm. The most serious annoyance is getting the spring collection, when always the fall is desired.

Black Haw (from North Carolina, South Carolina, Georgia, Mississippi). —As a rule one can readily recognize this. In several 100-pound packages were found some sassafras root, also pieces of sassafras root bark, sassafras stem bark, and black haw stem bark as a result of skinning the root too high. The tree bark of the black haw is reddish-brown internally (resembling sassafras), but grayish-brown externally.

Veratrum viride (From South Carolina, Georgia, New York).—We generally find in this a considerable amount of bethroot (trillium erectum), also a little podophyllum, poke-root and cimicifuga, all easily distinguished by their individual characteristics.

Pokeroot (From Virginia, North Carolina, South Carolina, Georgia, West).—This being so large is mostly cut up into various shaped pieces—longitudinal and transverse sections or discs, resembling calumba or bryonia. We often find it almost pure, but usually have present burdock, podophyllum, yellow dock, straw, feathers and dirt.

Wild Ginger From Maryland, North Carolina, South Carolina, South). —Although known to the trade and profession as Canada snakeroot, yet by the collector this is often called simply "snakeroot." In a 50-pound package was found 1 pound of veratrum viride and small amounts of podophyllum, blood-root, black cohosh, blue cohosh and comfrey, all being easily recognized by their respective characteristics.

Angelica (From North Carolina, South Carolina, South).—In a 50-pound bag one-fourth proved to be burdock, which is a harder, more woody root, requiring strength to break. It fractures with a short, quick noise, provided it be rich in resin, otherwise it is somewhat splintery, heavier, darker inside, and with less odor than angelica; external longitudinal furrows are prominent and continuous; the inside central portion, white, pithy, and one-fourth the thickness of the entire root. Angelica breaks like pith, having at first a slight bending movement; inside it is yellowish-white; outside brownish-gray.

Sassafras bark (From Maryland, Virginia, West Virginia, North Carolina, South Carolina).—This bark differs greatly, variation depending upon the season of collection, and the age of root from which taken. The best bark is bright yellowish-red, with pronounced taste, due to volatile oil. Sometimes we find stem bark, which is thicker, darker, and scarcely any sassafras taste, and also woody pieces of the root with bark intact.—Drugg. Circ., Aug., 1897, 210.

Plant Substances—A Key to the Simple Methods of their Identification.—Rodney H. True has prepared a key in which he attempts to arrange for ready use in the laboratory the simpler methods of identifying the commoner plant substances under the microscopic lens. Experimental trial of this key in laboratory practice during the past two years has confirmed its utility. It may be consulted with advantage by experimentation in Pharm. Review, Jan., 1898, 9–11.

ALGÆ.

Hai-tas—A Source of Vegetable Gelatin.—Gehe & Co. (Handelsbericht, 1898, 25), call attention to *hai-tas*, a Chinese drug which is used in preparing vegetable gelatin or isinglass, and which is probably

Laminaria bracteata. It occurs in strips a meter long and about 6 Cm. wide, has a whitish-dusty, or dirty-brown appearance, but when softened up in water shows a greenish-brown color, and becomes tough and leathery. To boiling water it communicates a thick mucilaginous consistency, but no gelatinization follows upon cooling. The alga is cooked and eaten in Japan, and is also used as food in China.

FUNGI.

Fungi—Ammoniacal Fermentation Induced by Soluble Ferments, Characteristic of Certain Species—D. Semal has observed that certain members of the mucedineæ—such as *Penicillium*, *Aspergillus*, and *Fusarium*—when cultivated in media containing organic compounds having the amidogenous radicle NH_2, are capable of producing ammoniacal fermentation. The doubling of this nitrogenous compound takes place with the assistance of a soluble ferment secreted by different fungi, and this ferment possesses an individuality belonging to each.—Pharm. Jour. May 14, 1898, 449; from La Cellule, xiii., 255.

Fungi—Occurrence of Nitrogenous Pigments in Certain Species.—R. Van den Dries finds nitrogenous pigments of the nature of aspergillin in *Aspergillus niger*, *A. puliginosus* and *Polyporus sulphureus;* while in other species of *Aspergillus*, and in *Fusarium hordei*, he finds pigments of a very different character, one of them having a basic character. The pigments partaking of the nature of aspergillin, while related to one another, are not identical. They have an acid reaction, and are probably true amides. Aspergillin is not a hæmatin, contains not even a trace of iron, and is very nearly related to tannin.—Pharm. Journ., May 14, 1898, 449; from La Cellule, xiii., 413.

Yeast—Production of a Red Pigment.—Dr. Casagrandi calls attention to a yeast producing a red pigment, which he considers to be an offshoot from the red yeast

Saccharomyces ruber, discovered by Demme some seven years ago. The latter stated that his variety was not endowed with any fermentative properties, but that isolated by Casagrandi ferments glucose very readily. Both Demme's and Casagrandi's specimens are pathogenic to guinea-pigs, rabbits and rats, when subcutaneously introduced into these animals; whilst, when grown in milk, they are both capable of so modifying the character of this liquid that dogs and rabbits fed with it develop diarrhœa, and the same symptoms have been observed in babies which had partaken of milk in which red yeast had been growing. The yeast appears to be present in our surroundings, and may, therefore, at any time make its presence felt by obtaining access to milk if the latter is left unduly exposed.—Pharm. Journ., Jan. 8, 1898, 25; from Annali d'Igiene Sperimentale, through Nature, lvii., 158.

Red Yeasts—Observations on Three Forms.—Katherine E. Golden and Carleton G. Ferris describe three forms of the so-called "red yeasts," together with the culture methods and media used in their study. The three forms were all obtained from the air of the laboratory. None of the three are true saccharomyces, and two of them appear to be new species. —Pharm. Review, March 1898, 114; from Bot. Gazette, *25*, 39.

"*Ginger-Beer*" *Plant—Varieties and Relation to* "*Kephir.*"—In a former paper Professor H. M. Ward has pointed out the resemblance between "kephir" and the symbiotic compound organism known as the "ginger-beer" plant, and has given reasons for believing that the bacterium is introduced with the sugar used. He now has good reasons for believing that there are several distinct varieties of kephir and other ginger-beer plants, and that in all cases the schizomycete, which he named *Bacterium vermiforme,* is concerned, but associated with different yeasts. It appears certain that the bacterium can be artificially made to form a symbiotic union with other yeasts than the one he had used in 1892, the ærobic yeast protecting the anærobic bacterium. He describes the case of an ærobic bacterium, derived from grains produced as excrescences on the sugar-cane in Madagascar, which is capable of fermenting sugar to carbonic acid and some other organic acid, and requires merely such traces of nitrogen as would be present in moist sugar. The liquid produced had a pleasant acid taste at the end of the fermentation.—Pharm. Jour., July 3, 1897, 6; from Annals of Botany, xi, 341.

Bacillus tartricus—A New Ferment.—L. Grimbert and L. Ficquet have isolated a new bacillus, which rapidly converts tartrates into acetic and succinic acids with the evolution of carbonic anhydride and hydrogen. It acts best under anaerobic conditions at about 36° C. The organism has been called *bacillus tartricus,* and is regarded as quite distinct from certain tartaric ferments to be hereafter isolated.—Pharm. Journ., Mar. 5, 1898, 227; from Journ. de Pharm. et de Chim. 6, vii, 97.

Moulds—Some Kinds Found in Medicinal Solutions.—Prof. Smith Ely Jelliffe gives a description of a number of moulds observed by him in various medicinal solutions, their characteristics being exhibited in drawings accompanying the test. *Saccharomyces glutinis*, Fres., the so-called "pink yeast," is found in acid, neutral and slightly alkaline media, and is by no means rare in the air of New York City. It does not seem to have the power of fermenting gluose or inverting other sugars. On the other hand, *Saccharomyces niger*, Marpman, seems to be of rare occurrence. It was found in a compound syrup of hypophosphites containing strychnine. *Monilla racemosa*, Pers., has been found in different solutions, and on the exposed flesh in a museum jar. In the latter form it had a peculiar and offensive odor. *Hormodendron cladosporioides*, (Fres.) Sacc., is one of the commonest forms of the brown moulds found in the air of New York City, but has been found but once by the author in a medicinal solution, namely infusion of wild cherry. Two other forms are described by the author as occuring in the air of the city, but it appears that he has observed only one of them in medicinal solutions. They are *Alternaria tenuis*, Nuttall, which is very common, and *Fusarium roseolum* (Steph.) Sacc., which, while not common, has been observed in wintergreen water. Drugg. Circ. Sept. 1897, 246.

Ergot—Proximate Constituents.—According to the investigations of C. Jacobs, the specifically active substance of ergot is a substance of a resinous nature to which he has given the name

Sphacelotoxin. It is present in very small amounts, but is extremely potent, and being capable of combining with basic, neutral or feebly acid substances, he is of opinion that a small admixture of this substance may be the cause of the activity of the various products that have been extracted from ergot. Sphacelotoxin is readily decomposed in the free state, but durable when combined with either ergochrysin, with which it forms chrysotoxin, or with secaline, with which it forms secalintoxin.

Ergochrysin is an inactive yellow substance.

Chrysotoxin is a yellow substance which crystallizes with difficulty. It is without smell or taste, readily soluble in ether, chloroform, alcohol, or benzene, but insoluble in water, petroleum spirit, or dilute acids. By prolonged contact with alkalies it is converted into an inactive acid—ergochrysinic acid. The composition of chrysotoxin is represented by the formula $C_{21}H_{24}O_{10}$, and it is regarded by the author to be a phenolic substance, probably related to anthracene or phenanthrene.

Secaline is crystallizable, freely soluble in chloroform, sparingly in ether, alcohol, or benzene, almost insoluble in petroleum spirit, water, dilute ammonia or alkaline solutions. Its composition is represented by the formula $C_{19}H_{55}N_6O_{14}$, and it is physiologically inactive.

Secalintoxin was obtained in the state of an almost colorless powder which on analysis gave the formula $C_{18}H_{24}N_2O_2$. It is freely soluble in alcohol, acetic ether, benzene, or chloroform, less soluble in ether, and insoluble in petroleum spirit.

The author suggests that Tanret's ergotinine may be a compound of the crystallizable inactive base (secaline) with sphacelotoxin, and sphacelotoxin might be combined with Kobert's cornutin, so as to produce the action peculiar to both constituents.—Pharm. Journ., July 31, 1897, 84–85; from Arch. Exp. Path.. xxxix., through Apoth. Ztg., xii., 494.

Ergot—Preservation by Means of Tolu Balsam.—L. Aymonier recommends for the preservation of ergot that it be immersed, while fresh, in an ethereal solution of tolu balsam, then immediately taken out, dried, and placed in a stoppered bottle. In this way he has preserved ergot for eight months without any change, the treatment giving the ergot a slight taste, but not otherwise affecting it.—Pharm. Journ., June 8, 1898, 24; from Journ. de Pharm. et de Chim. (6), vi., 359.

Oat Smut—Proposed Use as a Pigment for Artist's Use.—D. Paterson recommends the use of the deep brown or sepia-colored spore dust often seen on cereals as an artist's pigment. Twelve heads of smutty oats yielded 6 Gm. of the dust, and this was mixed with gum and water to form a water-color pigment, after a preliminary moistening with a few drops of alcohol. The pigment is not appreciably affected by light or air, even when exposed for several months, and with mild, diffused daylight—such as that of an ordinary, well-illumined room—the color remains quite fast and unaltered. In its deepest tones it is of a fine sepia shade, deepening to a brown-black, and on diluting with water or Chinese white, pleasing tints of a flat brown, of the pheasant-egg cast, are obtained.—Pharm Journ., Feb. 26, 1898, 186; from Nature, lvii., 364.

Amanita—A Tox-Albumin, a Constituent of Different Species.—Professor Kobert has obtained a tox-albumin from *Amanita phalloides*, to which he applies the name

Thalline.—It causes, when present even in very minute quantities, dissolution of the red corpuscles of the blood, followed by the liberation of certain ferments. The same substance has been detected also in other species of the same genus, viz., in *Amanita virescens*, *viridis*, *citrina*, *virosa*, *mappa*, *recutita*, and *porphyria*.—Pharm. Journ., April 23, 1898, 385; from Trans. Brit. Mycol. Soc., 1897, 27.

LICHENES.

Lichens—Characteristic Species Growing on Cascara Bark.—According to Senft, three kinds of lichens are characteristic of cascara bark, which he describes as follows:

Thelotrema rhamni-purshianæ.—In this the fructification is embedded in a whitish-grey smooth crust, and the apothecia are semi-orbicular, yellowish, 0.2 to 1.0 Mm. broad, with pore opening at the apex and a depressed blackish die. The spores are large spindle-shaped, hyaline, muralilocular, with 8 to 16 dissepiments. Paraphyses are thread like and loose. Never having found eight spores in one ascus, the author considers this lichen to be different from the one described by Fee.

Ochrolechia rhamni-purshianæ.—In this the apothecia are platter-shaped, 0.3 to 1.5 Mm. long, and rest on a smoother slightly torn crust. Primarily the fruits are entirely covered by a thick white covering, which opens later, and then shows an orange-colored disc. The club-shaped asci are situated between thread-like paraphyses, and contain eight large elliptic hyaline spores with a very thin epispore. This lichen appears to be found only on cascara sagrada.

Arthonia complanata.—In this the fruits are black, 0.3 to 0.5 Mm. broad, and up to 1 Mm. long. The hyaline greenish spores are elliptic, 6 to 7 septate, the segments at the apex being twice as long and a little broader than the others, while the lowest is much smaller but longer than those in the middle. When ripe, the spores are brown. The asci contain eight spores, and are united with the paraphyses in a gelatinous mass.—Pharm. Post, 1897, 431.

Roccella—Revision and Distribution of Species.—Dr. O. V. Darbishire communicates the following revision of the genus *Roccella*, the features of which, as now limited, being as follows: The cortical fibres are perpendicular to the upper surface of the thallus; the spores are colorless, the hypothecium black, and the apothecia circular, and the soredia are colored red by solution of chloride of lime. He includes seventeen species, of which *R. fuciformis*, D.C., *R. phycopsis*, Ach., and *R. tinctoria*, D.C., are European. *R. balfourii*, Mull. Arg., *R. hypomecha*, Ach., *R. flaccida*, Del., *R. mauritiana*, Darbish., *R. canariensis*, Darbish., are African, and *R. portentosa*, Mtg., *R. gagana*, Mtg., *R. peruensis*, Krphbr., *R. difficilis*, Darbish., *R. dubia*, Darbish., *R. caribœa*, Darbish., *R. decipiens*, Darbish., *R. montagnei*, Bil., and *R. sinensis*, Nyl., are Asiatic, *R. montagnei* and *R. phycopsis* occurring also in Australia. Other species formerly included under *Roccella* are now referred to other genera.—Pharm. Journ., April 16, 1898, 366; from Ber. d. Deutsch. Bot. Ges. xvi, 6–16.

Iceland Moss—Anti-Emetic Properties of a Tincture.—Deying and Bricemoret found that a tincture of Iceland moss, prepared 1 : 5 with 80 per cent. alcohol, had marked properties in arresting vomiting in numerous cases in which emesis resulted from various morbid states, but the authors have not had the opportunity of trying the remedy in the sickness of pregnancy. The dose given was 30 to 50 drops.—Pharm. Journ., Oct. 30, 1897, 378; from Rep. de Pharm. 3, ix, 461.

FILICES.

Male Fern—Constituents.—According to the investigation of Böhm, male fern contains the following bodies:

Aspidin, $C_{23}H_{28}O_7$, in yellowish prisms, insoluble in water, soluble in hot alcohol.

Albaspidin, $C_{22}H_{28}O_7$, in colorless needles, melting at 148° C.

Flavaspidic Acid, $C_{23}H_{28}O_8$, in golden yellow prisms, insoluble in water.

Aspidinin, in colorless rhombic tables, melting at 110° C.

Aspidinol, $C_{12}H_{26}O_4$, crystallizing in long needles or in rhombic prisms, melting at 143° C.—Pharm. Journ., July 31, 1897, 84; from Annal. d. Pharm. iii., 283.

Male Fern—Conditions of Efficiency.—Prof. Böhm has made investigations with the purpose of ascertaining the conditions of variations and their causes in male fern, his observations being published in a recent report by Gehe & Co. He finds that so far as the efficacy of the extract is concerned, aspidin and filicic acid, although differing in action, are the chief factors. In the investigations made particular attention was given to the estimation of these two constituents. Of eleven extracts under examination, six contained much aspidin (from 2 to as high as 3 per cent.), and no filicic acid; four only filicic acid, and no aspidin, while one contained traces of aspidin together with filicic acid. These results are worthy of attention, inasmuch as they seem to show that the presence of much aspidin precludes the presence of filicic acid, and vice versa. As, however, according to the long-continued observation of Böhm, an extract rich in aspidin is to be given preference over one containing much filicic acid, it was interesting to study the conditions upon which the presence or absence of either constituent was dependent. The possibility that in an extract aspidin might be converted into filicic acid, or vice versa, seems to have been excluded by numerous investigations along this line. No more can the age of the drug be considered a dominant factor alone, as all preparations are made from the fresh drug; but it is noteworthy that the active constituents were present in varying quantity, sometimes one and again the other predominating. The time of collection (spring or fall) was also the like in each case, so it also, by itself, cannot be the essential factor. The indications, in fact, all seem to point to the conclusion that the factors of habitat and conditon are the dominant ones in the formations of aspidin and filicic acid. Also, that the question of variety, a great many varieties of the plant being known, probably counted.—Amer. Drugg., June 25, 1898, 342.

AROIDEÆ.

Arum Maculatum and A. Italicum—Presence of a Coniine-like Alkaloid in the Herbaceous Portions.—By operating upon 100 kilos of the fresh herb, Herbert and Heim have obtained from *Arum maculatum* and *A. italicum*, 4 or 5 grammes of crude alkaloid as a brown oily liquid, having a strong mousy odor, fuming with hydrochloric acid, and giving a crystalline hydrochloride. It agrees with coniine very closely, the chief difference observed being in its physiological action, which was less potent than that of coniine, though the post-mortem appearances were very similar. The authors have also determined the presence of a saponin in the arum tubers. This is less toxic than typical sapotoxin, and does not seem to exert the same influence on the cardiac contractions.—Phar. Jour., July 31, 1897, 84; from Compt. rend., cxxiv., 1368.

Arisæma Triphyllum—Experiments on its Morphology.—George Atkinson has made some observations and experiments on the change of sex of the Indian turnip. Female, male and neutral plants, the history of which was known by growing them in pots for one season, were potted, some in rich soil and others in poor soil, the object being to change them from male to female, etc., by varying amounts of nutriment. Male plants in rich soil were in one year changed to female, and large neuter plants in rich soil were changed to female. In a second series, large two-leaved female plants, with large bulbs, were selected at the time the fundament of the flowers was formed. The bulbs were cut so as to remove all but a small portion in connection with the bud. By this removal of the larger part of the stored food the plants were changed to male.—Pharm. Review, March, 1898, 115; from Bot. Gazette, *25*, 114.

"Donkin"—Cause of its Repute as a Poison in Surinam.—According to J. F. Tool, "donkin," by which name the natives of Surinam designate *Diffenbachia sequinum*, Scht., contains neither an alkaloid, glucoside nor a bitter principle to which its reputed poisonous character can be attributed. The poisonous character of the plant, to which cattle especially often fall a victim, seems due rather to the presence of innumerable microscopical needles of calcium oxalate in the parenchyma cells. These fine needles, which cause a violent itching when a stem of the plant is rubbed between the hands, penetrate the tongue and throat of the animal, causing these to swell, and the animal chokes to death. As a remedy, softening substances like syrup or sweet oils are considered best.—Pharm. Review, April, 1898, 148; from Nederl. Tijdschr. Pharm., *10*, 21, through Chem. Centralbl., *69*, 520.

CYPERACEÆ.

Carex Chordorhiza—Occurrence in Great Britain.—Rev. E. S. Marshall describes a sedge, *Carex chordorhiza*, which is new to the British Isles, but occurs on the Continent as far south as France, Bavaria, and the Tyrol. The inflorescence consists of a single ovate, or when in fruit, triangular spike, the upper flowers of which are male. The stigmas are two, the glumes light yellowish-brown, somewhat darker in the centre, with a hyaline border, and the fruit is a pale-yellow dotted oblong lanceolate nut, with a slender beak nearly equaling its length, and projecting a little beyond the obtusely bifid beak of the perianth. The rhizome is about the thickness of coarse twine, and is stoloniferous and sulcate. The leaves are about 1 to 1½ lines broad. The plant grows in very wet peat bogs associated with *C. limosa*, and was found by Messrs. Shoolbred and Marshall in the north of Scotland.—Pharm. Journ., April 2, 1898, 325; from Journ. of Botany, March, 1898.

GRAMINACEÆ.

Cereals—Research on "Rusts."—In a *resumé* (Bot. Gazette, *25*, p. 26), Jacob Erikson presents the results of research on grain rust, made in the course of several years, the present paper containing many items ot great interest both from the purely scientific and from the applied practical side. One of the most important conclusions pertains to the time of infection of the host plant, and the relation of the host and the parasite from that time until the latter makes its appearance as a disease at the surface of the host. The older theory concerning the infection of the various cereals by fungi, which produce the "rusts," assumes the infection taking place always in the growing plant, and often well on toward the time of harvest. But while this may be so, Dr. Erikson finds that in very many cases the parasite is present in the young host plant from the beginning. In such cases it was inherited from the parent host plant, and may remain for a longer or shorter period in a latent symbiotic condition, sooner or later to take on an actual condition and produce disease.—Pharm. Review, Feb., 1898, 72.

Andropogon annulatus, Forsk.—*A Source of True Manna.*—R. T. Baker and H. G. Smith describe a true manna found on a "blue grass," *andropogon annulatus*, Forsk.—It yields about 58 per cent. of mannite, and contains glucose and other sugars. This

"*Blue-Grass Manna*" is mostly white, resembles "Eucalyptus manna" in general appearance, and is sweetish to the taste, not moist, easily broken, and feels slightly greasy.—Pharm. Journ., July 3, 1897, 6; from Proc. Roy. Soc. N. S. Wales.

PALMACEÆ.

Dragon's Blood—Confusion With Kino.—Professor Ed. Schaer observes that notwithstanding the numerous varieties of dragon's blood and kino which have been described as having sharply-defined characteristics, it is quite difficult in some cases to draw a sharp distinction between the two drugs. There are many analogies between the two drugs, and while one contains a larger amount of resin than the other in proportion to the amount of tannin, it must be borne in mind that in the plant itself tannin is not infrequently converted into resin. The author is convinced that some kinds of resin which have been known for hundreds of years as dragon's blood are in reality kino. The so-called West Indian dragon's blood, also called South American dragon's blood from *Pterocarpus Draco* and species of *Croton*, which were formerly used, are no longer found in the market, but were distinctly different from the African dragon's blood. The secretion of the *pterocarpus* contains all the characteristic constituents present in the Malabar kino. The kinos derived from the *Myristicæ* are more characteristic in that they contain a larger quantity of calcium salts, to which also the lighter color of the drug is due. The base appears in the drug in the form of a tartrate with a small admixture of oxalate.—Amer. Drugg. Oct. 25, 1897, 246; from Proc. Soc. Germ. Nat. & Phys. Sept. 1897.

Cocos Nucifera—Description.—Dr. Roger S. Chew, of Calcutta, gives an interesting description of the cocoanut palm. The tree, averaging 38 feet, sometimes attains a height of 120 feet, the stem or trunk rising sheer from a large tap-root encircled by hundreds of suckers or rootlets of a dark color, which are partly exposed above ground, and contrasting strongly against the slaty-brown of the trunk, look somewhat like a head with gigantic hair partly stuffed into the ground. The diameter of the stem varies from 20 to 33 inches. After the plant has attained a height of 4 to 6 feet, the trunk is formed by the annual falling off of the leaves and shedding down the "cabbage"—the succulent middle sprout—which leaves a circular depressed scar bordered by rough ridges on the bark, so that counting the number of depressions and adding 1.5 plus the number of the month of the year, will give the exact age of the tree. The leaves are circularly arranged, in sets of seldom less than six and never more than twelve; they average 10 feet in length, but sometimes 20 feet, and give the tree the appearance of a huge feather-duster. From the extreme summit of the tree springs the pale, yellowish-white, fringed with shades of green, tender, succulent middle sprout, which, on account of its edible qualities, is known as the "cabbage." This is considered a great delicacy, but its use, except on special grand religious occasions, is prohibited, because its severance means the death of the tree. The flowers, which make their appearance when the tree is from 5 to 6 years old, are hermaphrodite and encased in a tough, grayish-white sheath, from 16 to 40 inches in length, which thus constitutes the bud. When this opens on its nether surface, it exposes clusters of the beautiful white flowers, rich in resin gum, sugar and alcohol (? Rep.), but with scant odor. The unopened buds are considered a great delicacy, and form the basis of several Indian condiments. At this stage of its existence the tree secretes a larger proportion of sap, containing much sugar and amylaceous matters, that rapidly undergoes alcoholic fermentation. The natives, taking advantage of this fact, cut off a portion of the spathe containing the unopened buds, and attach an earthen vessel to the wounded stump, into which exudes, during 12 hours, some 30 to 60 ounces of a translucent sweetish sap with an agreeable taste, which is greedily drunk in the raw state, but yields, on evaporation, a crude brownish-yellow sugar, called "*Jaggeri*," or "*Goor*." A similar product is obtainable from the flowers, by extracting them with water; and on fermenting the sap and distilling the liquid a liquor, commonly known as "arrack," is made. This is not, however, the liquor known as "palm brandy," by some, but more properly as "palm wine," which is a product of the maldive or butyrac nut. The author describes the fruit, which is produced from only a small percentage of the flowers, since from 80 to 90 per cent. of the latter drop off. These fruits, while they are the most important produce of the tree, are not by any means the only parts of the plant that find useful application. Some of these have been already mentioned. Others are the trunk, which affords dug-out canoes, cradles, coffins, troughs, aqueducts, masts, fuel and timber: the leaves furnish brooms, tooth-picks, baskets, and the basal web, or fibrous jacket of the leaves, is used for hair nets, aprons, teapot covers, etc., while the brownish-red powdery substance, which is sprinkled thickly on the web, is used as an anthelmintic, astringent and a specific in menstrual aberrations. The leaves also find use as fodder, for thatching houses, and a great variety of other useful purposes.—Amer. Drugg., Sept. 10, 1897, 129.

PONTEDERIACEÆ.

Water Hyacinth—A Pest in the Streams of Florida.—Attention is called in "Bulletin No. 18, Div. of Botany, Dep. of Agriculture 1807," to the rapid and profuse development of the water hyacinth, *Piaropus crassipes*, Mart., in the St. John's River and adjacent streams in Florida. First introduced from northern South America, it found its way into the St. John's River in 1890, where, for a time, it was favored by the inhabitants and a wider distribution given it on accout of the large masses of beautiful flowers. Its development has now however gained such proportions that it offers serious harm to the lumbering and fishing industries (and even to navigation, Rep.), and it has become a serious problem how to get rid of the pest, not alone on this ground; but also because the decay of large masses of the plant threatens the health of communities. It is a floating water plant bearing leaves which form a rosette from 1 to 2 feet high. The basal parts of the young plant are strongly swollen, these inflations acting as air-reservoirs to buoy up the plant. The roots form a dense, bushy mass, hanging down 2 feet or more.

MELANTHACEÆ.

Veratrum Viride—Monographic Description.—Prof. John Uri Lloyd briefly reviews the history of *Veratrum viride* from its introduction from Europe in 1742—or, according to most authorities, 1763. He gives a description of the principal botanical features of the plant, the text being illustrated by well executed drawings of the principal organs of the plant in natural size. The chemical constituents of the rhizome are carefully described in the order of their discovery, together with the medicinal properties and pharmacopœial uses of the drug. A bibliography appended to the paper comprises twenty-eight references.—West. Drugg., October, 1897, 447–449.

Veratrum Viride, Ait. and Veratrum Album L.—Histological Compari-

son.—R. H. Denniston communicates the result of a study of the histological character of *Veratrum viride* and *V. album* rhizomes, undertaken with the object of discovering a test, if possible, which would serve to distinguish the one from the other in the powdered condition. The rhizomes of the two plants differ very little from each other in color, size, shape, or general appearance, except that in the European species, *V. album*, the roots are frequently removed from the rhizome, while in the American species, *V. viride*, they are generally still attached after drying. The anatomical structure of the two rhizomes also shows no marked elements of distinction. It is true, that when examined under the microscope, differences in any two samples compared, such as thickenings of the cell-wall of the cylinder sheath, size of cells, etc., are not difficult to find; but when several specimens are studied, these differences are not found to be constant. Greater differences are, however, found in the root. Directly beneath the epidermis in the *V. viride* the collenchyma region consists of but two or three veins of large, irregular and distorted cells, while, in *V. album* this region is generally made up of seven to eight rounded, thicker-walled and smaller cells, which are not in the least distorted. As a general thing, also, the whole cortical region consists of smaller and more regular cells than in *V. viride*, while in the central bundle a somewhat larger number of wood rays are usually found, whose tracheæ do not approach the size of those of *V. viride*. But these differences in root structure are of practically no value in identifying the drugs in powder, as the rhizome of *V. album* is generally free from the roots before powdering. The value of chemical reagents for distinguishing between the powders of the two drugs was also studied. The whole list of alkaloidal reagents was tried, both precipitants and those furnishing color tests of these; many showed differences, more of intensity than of different shades of color. In every case the powder of *V. album* showed a deeper color than did that of *V. viride*, which agrees with the analytical results of the two drugs, the alkaloidal content of the latter being only one fifth that of *V. album*. But while these reactions may answer very well to distinguish between the separate powders, when these are mixed, the difference being mainly one of intensity, they are of no practical value. The author's paper is accompanied by a plate showing the principal histological characters of the drugs in ten illustrations.—Pharm. Archives, March, 1898, 68–71.

White Hellebore—Estimation of Alkaloids.—Charles H. LaWall recommends the assay process of Dr. Keller for estimating the alkaloids in white hellebore, as follows: Place in a dry flask, 10 Gm. white hellebore, 25 Gm. chloroform, 75 Gm. ether, and 10 Gm. 10 per cent. ammonia water. Shake vigorously, and allow to stand for six hours or over night, then add 5 Cc. of 10 per cent. ammonia water, shake well, and pour off 50 Gm. of the clear solution (representing 5 Gm. of the white hellebore). Transfer the solution to a separatory funnel and shake out the alkaloid with acidulated water, using three fractions of 20 Cc. each. Place the aqueous washing again in the separatory funnel, and, after rendering alkaline with ammonia water, shake out the alkaloid with a mixture of chloroform 3 volumes and ether 1 volume. Evaporate the alkaloid solution in a tared capsule to ascertain the percentage in the drug. Five samples of the powdered drug, in the form in which it is sold as insecticide, yielded 1.20, 1.24, 1.28, 1.12 and 1.18 per cent. of alkaloid by this method, while a sample of the whole drug yielded 1.75 per cent.—Proc. Penna. Pharm. Assoc., 1897, 75.

LILIACEÆ.

Convallaria Majalis—Poisoning by the Fluid Extract.—Dr. J. H. Andrew describes the effect of poisoning by lily-of the valley in the case of a two-year-old child to whom a teaspoonful of the fluid extract had been given by mistake. The characteristic symptoms were restlessness, a continuous trembling of the limbs, and once general convulsions. The patient was aroused with difficulty and immediately relapsed again into stupor. The pupils were moderately dilated; temperature 90° F.; pulse 140 at times and again so rapid that it could not be counted, but always exceedingly irregular; respiration shallow and superficial, rather rapid but very regular; face somewhat flushed; no gastric-intestinal irritation, neither diuretic nor diaphoretic effect. Consciousness was gradually regained and also the normal condition.—Pharm. Review, March 1898, 114; from Therap. Gaz. 22, 144.

Colchicum Seed—Relative Value of Proof Spirit and of Acetic Acid as Solvents of their Alkaloidal Constituents.—R. C. Cowley and T. P. Catford report upon the results of some investigations undertaken with the purpose of determining the relative value of proof spirit and of acetic acid as solvents for the alkaloid of colchicum seed. Two preparations were made from commercial specimens of the powdered drug: a tincture by the B. P. process, and a vinegar by maceration and percolation with dilute acetic acid until 8 parts of the percolate were obtained from one part of the drug. The alcoholic preparation contained a considerable quantity of a fatty oil, some of which separated spontaneously in cold weather in the form of oily globules and as solid white flakes. The acetic preparation, on the other hand, was free from the oily matter, but the dilute acid had the effect of dissolving a large percentage of mucilaginous matter, thus necessitating special preliminary treatment before the alkaloid can be determined with accuracy. The authors describe this treatment and the assay process in detail, their results showing that acetic acid does not possess, as is commonly supposed, any advantage over weak spirit as a solvent of the alkaloid of the drug. From 100 Cc. of the *alcoholic tincture* an average of 0.087 per cent. of alkaloid, corresponding to 0.75 per cent. in the seed, was obtained; while the same quantity of the vinegar yielded

0.081 per cent., being an assay of 0.728 per cent. in the seed. The authors extended their investigations also to the

Assay of Commercial Samples of Extracts of Colchicum.—One specimen each of the acetic and ordinary extract were dealt with. The chief difficulty in estimating the alkaloidal strength of these consists in removing the large proportion of mucilaginous matter, etc., which makes it quite impossible to exhaust by direct treatment. They removed these by dissolving the extract in a small quantity of water, and then poured it drop by drop into alcohol contained in a bottle, shaking after each addition. The granular precipitate aggregates eventually, but not before the spirit has had time to thoroughly penetrate it. The percentage of alkaloid in the acetic extract was 1.27, corresponding to 1.62 in the extract dried at 100° C., and the percentage in the ordinary extract was 1 23, corresponding to 1.55 in the extract dried at 100° C.—Pharm. Jour., Feb. 5, 1898, 131–132.

BROMELIACEÆ.

Pine Apple—Composition of Ash.—J. J. Bourey gives the following composition of the ash of the pine apple: K_2O, 49.42 per cent.; KCl, 0.88 per cent.; NaCl, 17.01 per cent.; MgO, 8.80 per cent.; CaO, 12.15 per cent.; P_2O_5, 4.08 per cent.; H_2SO_4, trace; SiO_2, 4.02 per cent; ferric phosphate, 2.93 per cent. Judging from the analysis, potash is the most important mineral substance required by the pine apple. Next to this, phosphoric acid, lime, magnesia, and iron.—Am. Jour. Phar., July 1897, 369; Bull. Bot. Dep. Jamaica, *3*, 236.

DIOSCOREACEÆ.

Dioscorea Hirsuta—Presence of a Single Alkaloid.—Plugge and Schutte, in contradiction to the observation of Boorsma, that the roots of *dioscorea hirsuta* contains two alkaloids, find only a single one, *dioscorine*, melting at 43.5° C., and having the composition $C_{13}H_{19}NO_2$. It is crystalline, and forms an anhydrous hydrochloride, which melts at 204° C. In its action, it is similar to picrotoxin, but weaker.—Pharm. Ztg., 1897, 678.

Dye-Yam—A Valuable Indo-Chinese Tanning and Dyeing Material.—Augustin Henry calls attention to the "dye-yam"—the *cuneo* of the Annamese, *shu-lang* of the Chinese, and *faux-gambier* of the French—which is sent in enormous quantities from Indo-China to Southern China, where it is used for tanning fishing-nets and for dyeing certain fabrics, such as coarse silk and cotton mixtures. It is the root of

Dioscorea rhizogonoides, Oliver, which occurs also in South China and Formosa, but only in sufficient quantity to satisfy local requirements. Considering the cheapness and amount of this material, it might be worth while making some experiments with it with the object of its utilization in England, etc.—Pharm. Journ., Jan. 15, 1898, 47.

Sweet Potatoes—A Proposed Source of Starch.—A series of experiments made at the Agricultural Experiment Station of Clemson College, South Carolina, point to the availability of sweet potatoes as a source of starch. It has been found that at least 22 per cent. of starch can be counted upon in most varieties, while in some kinds the yield is considerably higher. From a calculation of the average yield of sweet potatoes in South Carolina as compared with the average yield of corn or wheat in favorable localities, it would appear that the amount of starch yielded by the sweet potatoes per acre is greater than that obtainable from the produce of an acre of either of the cereals. But it remains to establish that the sweet potato can be profitably raised for this purpose, as well as its quality and fitness for the purposes for which the starch from cereals is commonly used.—Merck's Rep., Sept. 15, 1897, 573.

NARCISSEÆ.

Lycoris Radiata—Isolation and Characters of Two Alkaloids.—K. Morishima has isolated from the herb of *Lycoris radiata* two alkaloids, which he describes as follows:

Lycorine, $C_{32}H_{32}N_2O_8$, crystallizes from alcohol in colorless polyhedric crystals, which become yellow at 235° C. and are decomposed at 250°. It is almost insoluble in water and difficultly soluble in alcohol, chloroform or ether. From acid solutions it is precipitated by most alkaloidal reagents. Characteristic is the behavior of lycorine with potassium permanganate, which gives a brown precipitate in neutral solutions of the alkaloid, but in excess of hydrochloric acid this precipitate dissolves with a blue fluorescence. Lycorine hydrochloride, $C_{32}H_{32}N_8O_8.2HCl+2H_2O$, forms colorless shining crystals melting at 208° C. Taken internally, lycorine produces vomiting and purging. The second alkaloid, which the author has named

Sekisanine, has the composition $C_{34}H_{36}N_2O_9$ or $C_{34}H_{34}N_2O_9$. It crystallizes from aqueous alcohol in long colorless crystals, melting at 200° C. It is odorless and tasteless, hardly soluble in water, difficultly soluble in ether, benzene or chloroform, quite soluble in alcohol. While most alkaloidal reagents precipitate it, potassium permanganate does not produce any fluorescence. Physiologically it is inactive.—Pharm. Review, May, 1898, 193; from Chem. Centrbl., 69, 254.

IRIDACEÆ.

Orris Root—Cultivation in Italy.—The following reliable information concerning the cultivation of orris in Italy, which has been going on for more than two centuries, is given in "Schimmel's Report" (Oct., 1897, 38). Orris is planted on hills and their declivities, never in valleys, mostly on sunny clearings, or between rows of vines in vineyards, seldom in extensive fields. It grows only in dry, strong ground. When planted, the plants need no further care. Generally the root is harvested in the third year, though during times of scarcity (high prices) it is frequently cut when only two years old. The age of the root may readily be recognized by the 2 or 3 fold joints. Half of the last joint remains on the living plant, which is replanted at once, or within two weeks in new ground. The freshly-cut roots are first placed in water to facilitate peeling. The peeled roots are then exposed to the sun for drying, which is generally accomplished within 2 weeks.

AMOMEACEÆ.

Amomum Danielli—Substitution of the Seeds for Cardamom.—The "Chemist and Druggist" (1898, 367), states that the seeds of *Amomum Danielli*—the yellow amomum or longouze of Madagascar—occasionally appear on the market as cardamoms. In shape these seeds are cylindrical-oblong, of a dark-brown color, with a prominent hilum of a lighter shade, and are highly polished; they have a camphoraceous taste, but are not known to possess any important medicinal virtue.

Cardamom Seeds—Substitution by Bastard Varieties.—Dr. B. Niederstadt says that in commerce there are found two principal varieties of cardamom seed, the small, or Malabar cardamom, and the long, or Ceylon cardamom, both being the fruit of *Eletteria cardamomum*. The wild cardamomum imported into Europe from Borneo is of comparatively little importance. There are, however, various other kinds of seed upon the market, including, for instance, the Siam cardamom, derived from *Amomum verum* and *rotundum*, and also a wild or bastard cardamom which is very similar to the Malabar variety and which is obtained from *Amomum xanthioides*. These varieties have decidedly declined in popularity in European markets, but they are nevertheless of considerable importance, since they are sometimes substituted for the more valuable varieties and are used to adulterate them. An admixture of the bastard cardamom materially decreases the strength both of taste and odor of preparations made from the seed so adulterated. The author gives the following as the results of analysis of the true (hulled) seed and of the bastard cardamom:

	True.	Bastard.
Water	15.25	15.50
Ether soluble extract	5.10	4.04
Ash	6.55	7.50
Starch and sugar	28.84	24.00
Cellular tissue, nitrogenous matters and extractive	44.26	48.96

Aside from a smaller proportion of fat and etheral oil there is no marked difference between the results yielded by the two. The bastard cardamom possesses, however, a much more intense camphor-like odor and taste and leaves an irritating and biting sensation in the throat and on the tongue. The bastard cardamom is of a dirty green color, whereas, as is well known, the true cardamom has a yellowish white color. This lighter color, however, is not natural, but the result of artificial bleaching, and this bleaching accounts for the presence of sulphuric acid in the official variety.—Amer. Drugg., Oct. 25, 1897, 245; from Proc. Soc. Germ. Nat. Phys., Sept., 1897.

Jamaica Ginger—Cultivation, Preparation for the Market, etc.—One of the most interesting pharmacognostic contributions of the year is Mr. F. B. Kilmer's paper entitled "In the Land of Ginger—Jamaica," from which the following brief abstract is made. While the ginger plant, *Zingiber officinale*, Roscoe (Amomum Zingiber), is a native of Asia, it has been introduced into most tropical countries, and has become so thoroughly identified as a product of the island of Jamaica, that the designation of "Jamaica Ginger" is popularly employed to accentuate the quality of all preparations that are claimed to be made from ginger. It is a plant that requires both sunshine and moisture as prime requisites to its growth, and both of these are supplied under the most favorable conditions in Jamaica, the most suitable elevation being in the central western portion of the island, along the borders of the parishes of Westmoreland, St. Elizabeth, Manchester, Clarenden, Tretauncy and St. James. The plant grows luxuriantly in some of the nooks or valleys with a pulverent mould or loam deposit of several feet over an underlying soil of white and yellow limestone, but does not thrive in marshy soil, nor where there is more than 10 to 20 per cent. of clay, or 30 per cent. of sand. While the government returns for the whole island give only 250 acres of land devoted to ginger, this acreage cannot be accepted as yielding the crop harvested (nearly 2 million pounds in 1896), a descrepancy which is accounted for by the fact that the real cultivation is not in acres, but in small beds, varying from six feet square up to the size of a building lot. Large plots are very rare, and only a few cultivators cultivate from one to six acres. For the most part, it is planted in any convenient spot, alongside of pineapples, yams, cassava or other plants, often in the midst of a dense growth of brush or weeds; as many as 25,000, and possibly 50,000 people being more or less dependant upon its cultivation and preparation for the market.

The ginger planter divides his crop into "blue" and "yellow" ginger, from the color of the rhizome, these being also known, respectively, as "turmeric" and "flint" ginger. Another division that is made is into "plant" and "ratoon" ginger, "plant ginger" being planted each season, while "ratoon ginger" is really a product of laziness, secured by leaving a part of the "hand" containing a bud in the ground when the crop is harvested. Ratoon ginger is much smaller in size of "hands" than the planted, and loses each year in flavor, each successive crop being less and less in amount. The planting, which is in May and April, is done by burying the divided "fingers," each division containing an "eye" or embryo in trenches a foot apart, similar to the process of planting potatoes. The small grower simply digs a hole in a convenient spot. The thrifty planter first burns the plot, then ploughs and lays the plot out into beds and trenches. The main problem then to secure a good crop is, free exposure to the sun, freedom from weeds—by keeping them down, not by pulling up and disturbing the ground during the growth of the plant—and abundant watering, by irrigation if the rainfall is not abundant. When the stalk withers the ginger, which, as is well known is the root stalk of the plant, is ready for harvest, and begins shortly after the bloom departs. While "ratoon ginger" is gathered from March to December, "planted ginger" is not ready for digging until December or January, the "ginger season" lasting until March. The rhizomes are twisted out of the ground with a fork, an operation that must be conducted with care and expertness lest the "hands" be bruised or injured to the detriment of their commercial value. The fibrous roots, which are about ½ inch long, and not very numerous, are broken off, the soil and the adherent matter at once removed, and the "hands" are then thrown into a dish of water, when they are ready for the "peeling." This is done by hand, and is regarded as quite an art, there being many expert peelers in Jamaica. The ginger knife is simply a narrow-edged blade riveted to a handle. In large operations an expert peels between the "fingers" of the "hands," less experienced hands peeling the other portion, the importance of great care in the peeling becoming evident from the fact that the corky layer immediately beneath the outer striated skin contains numerous oil cells, which, if ruptured, part with their colorless, pungent, aromatic contents on drying. The peeled rhizomes are immediately thrown into water and washed; and the purer the water and the more freely it is used, the whiter will be the product. The final curing of the ginger is then conducted by simply drying it by exposure to the tropical sun; when well dried it still retains moisture, which in six examples mentioned by Mr. Kilmer, amounts to from 7.2 to 12 per cent., when completely dried at 100° C. The process of curing (drying) requires from 6 to 8 days, and the loss in weight was found on the average to be about 70 per cent. Artificial drying, which is strenuously resisted by the natives, as well as the resort to various bleaching agents, do not appear to improve the quality of the ginger. Mr. Kilmer's conclusions are that, when well conducted, the native method of careful peeling and curing in the sun produces a handsomer and better product than any process yet suggested. And according to the degree in which this care is exercised, or according to the variation in the process of curing, and the size and shape of the hands, the product brought to market by the natives will vary, being sold by them, not by weight, but in "heaps" varying in size and weight according to quality and demand. If the "hands" are finely shaped and large, there are fewer in the heap, and they constitute when of light and uniform color, and free from evidences of mildew, the best grades; but this again is sorted into four or five grades, the highest having firm and full "fingers," without wrinkle or spots, while the lowest is shrivelled and small. The dark varieties form another grade, the heavy, tough and flinty a third, and these again are assorted according to size, color and texture, so that there seems to be no end to the varieties of ginger from Jamaica—the ratoon finger sorts generally bringing the lowest price, being small, soft and soggy, and lacking flavor.—Amer. Journ. Pharm., Febr. 1898, 65–85.

Bermuda Arrowroot—Mode of Culture and Preparation.—The "Kew Bulletin" (No. 135, 50–51) observes that hitherto no authentic account has been given of the arrow root industry carried on in Bermuda. One reason for the superior character of Bermuda arrowroot is the scrupulous care taken in every stage of the manufacture. The mode of culture is very similar to that of the common potato. The roots, after being collected, are washed, and their outer cuticle completely removed. This process requires care, for the cuticle contains a resinous matter which imparts color and a disagreeable flavor to the starch, and cannot be removed by subsequent treatment. The pared roots are then well washed, and crushed to a pulp between powerful rollers. The pulp is thrown into perforated cylinders, where it is agitated by revolving wooden paddles, while a stream of pure water carries off the fecula from the coarser fibres of the pulp, and discharges it through the perforated bottom of the cylinder. Thence it is conveyed in pipes, and passed through fine muslin strainers into reservoirs, in which it is allowed to settle, and the supernatant water drawn off. After repeated washings, it is again allowed to settle for some time, when the surface is skimmed with palette knives of German silver. The rollers and cylinders are made of brass and copper. The drying is conducted with equal care and cleanliness. The substance, spread in flat copper pans placed on rollers, is covered with white gauze and run under glass-covered sheds when there is danger from rain or dew. When dry it is packed with German-silver shovels in new barrels lined with paper, which is stuck in with arrowroot paste. The barrels are exported on the decks of vessels under cover, since, if placed in the hold, the arrowroot might be tainted by the effluvia of other freight.—Pharm. Journ., June 25, 1898, 585.

ORCHIDACEÆ.

Vanilla Planifolia—Monographic Description.—Prof. John Uri Lloyd has written a monograph on Vanilla which will be consulted with advantage in "Western Druggist" (Dec., 1897, 548–554). After giving the botanical description of the plant, which is illustrated by handsome drawings showing the flowering plant in natural size, the principal organs of the plant, and a portion of the vine with the beans attached, he speaks interestingly of the early history of the drug—from the time on when its use as a flavoring for cacao by the Aztecs became known to the discoverers of

Mexico. The methods of collecting, gathering, curing and packing the vanilla for market in Mexico and on Réunion are described, together with the varieties that are found in commerce, their distinctive character and values as flavoring agents, etc. The paper also gives some statistics concerning the production of the beans in different parts of the world, which show that the produce is practically confined to Mexico and Réunion, the produce of Guadaloupe, Mayotte, St. Marie, Tahiti, Seychelles and Mauritius being comparatively insignificant. The physiological properties and pharmacopœial uses of the drug are also given, and a bibliography, embracing 30 references, is appended.

Vanilla—Its Distribution, Habitat, Cultivation, Curing, etc.—At a regular meeting of the New York College of Pharmacy the subject of vanilla was discussed in all its aspects. Prof. H. H. Rusby described the distribution and habits of vanilla plants, and the cultivation and curing of the vanilla in a paper, which may be consulted in "Merck's Report" with much interest, while Prof. Smith Ely Jelliffe described the microscopical character of vanilla, the structure of the fruit and the mould found upon it. Prof. Virgil Coblentz gave an interesting review of the chemistry of vanillin; Adolph Henning gave an account of the commerce of vanilla and vanillin, and Oscar Kalish concluded the series by describing the preparation of vanilla extract.—Merck's Rep., Feb. 1 and 15, 1898, 74 and 104.

Vanilla—Cultivation in Seychelles.—According to a British Consular Report the cultivation of vanilla in Seychelles, which dates back about twenty years, is only now beginning to be thoroughly understood, and the large crop of 63,000 lbs. has given a fresh impetus to its cultivation, a very large quantity being now under cultivation. The Mexican system of allow ing the vines to grow under trees nearly wild is at present in vogue, and is said to be a decided improvement on the old system of training the vines on artificial supports.—The average yield is about 200 lbs. per acre.—Pharm. Jour., Nov. 27, 1897, 478.

ARISTOLOCHIACEÆ.

Asarum Canadense, L.—Probable Confusion with a New Species.—Henry Kraemer calls attention to the recent discovery of an additional species of *Asarum* by Eugene P. Bicknell, which has hitherto been confounded with *Asarum Canadense, L.* The most obvious differences between the two plants reside in the flowers. In *A. Canadense, L.*, the calyx-lobes are spreading and revolute, passing gradually into a slender, upcurved acumination, and the interior of the tube is purple nearly down to the base. In the new species, which Mr. Bicknell calls

Asarum reflexum, the calyx-tube is white within, and the flat and reflexed lobes are abruptly acuminate at the apex into a straight obtuse point. In the present paper Mr. Kraemer has analyzed the elements of the two plants, with their characteristics as given by Mr. Bicknell, side by side, so as to enable a ready comparison. From this, as well as from various citations from standard authorities on the botany of North America, it seems highly probable that the *A. Canadense* hitherto described by writers of medical botany has been really *A. reflexum*. The paper is illustrated by the electrotypes from the original paper of Mr. Bicknell in the November (1897) number of the Torrey Botanical Club Bulletin.—Am. Jour. Pharm., Mar. 1898, 144–152.

NEPENTHACEÆ.

Pitcher Plants—Presence of a Proteolytic Ferment.—Some years ago, Prof. S. H. Vines had pointed out an important analogy between the pitchers of several *nepenthes* species and the gastric mucous membrane of animals, by preparing from the secreting areas of the pitcher wall a glycerin extract which had a distinct digestive action on fibrin. Later observers have denied the presence of an active ferment, and declared that the disappearance of proteid matters placed into the pitchers was merely due to putrefaction set up by bacteria. Prof. Vines now brings forward additional evidence, which confirms him in his original conclusion, that an active digestive process is set up in the pitcher by a proteolytic ferment formed in the gland-cells of the walls. In one experiment, digestion was set up by a glycerin extract of the pitcher in a solution containing 1 per cent. of prussic acid, the extract retaining its digestive activity when kept for several weeks in pure glycerin—conditions which preclude the activity of any known organized ferment.—Pharm. Jour., Feb. 12, 1898, 140; from Annual of Botany, xi, 563.

SANTALACEÆ.

Osyris tenuifolia, Engl.—Source of An East Africa Sandal Wood.—Stuhlman and Volkens have discovered in East Africa a tree-like shrub, *osyris tenuifolia*, the wood of which is very similar to the Indian sandal wood. The plant belongs to the santalaceæ, and the agreeable smell is due to a brown resin with which the wood vessels are filled, and which originates in the medullary rays and the wood parenchyma.—Pharm. Journ., Jan. 15, 1898, 46; from Chem. Rep. xxi, 229.

LAURACEÆ.

Cassia and Cinnamon Barks—Varieties from China and Indo-China. Augustin Henry, corresponding member of the Pharmaceutical Society of Great Britain, contributes some interesting information concerning the cinnamon and cassia bark of Chinese commerce. So far as can be learned there appear to be three barks of commercial importance, but upon only one of them,

Chinese Cassia Bark, is our information at all definite or complete. As a result of Mr. Ford's investigation we know that the tree producing this bark is *cinnamomum cassia*, Blume, and it is cultivated in the Chinese provinces of Kwangsi and Kwangtung, whence it reaches Hong Kong by steamer and by junk. Thicker barks are distinguished by the Chinese as

Cinnamon, and a small quantity of this is produced in the same locality as the cassia bark, and is, according to Mr. Ford, simply the thick bark of very old trees of the same species. But while this is correct as regards the cinnamon produced in Kwangsi and Kwangtung, the kind of cinnamon most valued by the Chinese is

Laos Cinnamon, which comes from the Laos States, now controlled by France, and for which the Chinese—who consider it a remedy for all diseases—pay fabulous prices, as much as 50 dollars for a "pair of barks," each piece measuring about fifteen inches long by four inches broad. Concerning the botanical source of this kind of cinnamon, the only evidence is Thorel's statement in the botanical chapter of Garnier's "Voyage d' Exploration en Indo-Chine" that *cinnamomum cassia* grows wild in the forests of Indo-China, situated about 19° latitude. Mr. Henry has grave doubts as to Thorel's identification of this wild tree, of which he does not appear to have secured any botanical specimens, and he is on the whole inclined to think that this Laos tree is different. A third bark of commercial importance is

Annam Cassia. This does not appear to be known in the London market, but it is largely imported from Hong Kong into the United States, where it is known as

Saigon Cassia, or Saigon Cinnamon.—This is a misnomer, since it is not produced in Cochin China, of which Saigon is the capital, but is really produced in Annam. Nothing definite seems to be known as to the botanical source of this variety of cinnamon bark, except that the trees occur in the wildest parts of Annam, and there is no evidence of any cultivation. The bark is apparently distinct enough from the cassia bark of South China, and it is a mere assumption that the tree yielding it is *cinnamomum cassia*, Blume.—Pharm. Jour., Jan. 15, 1898, 47.

Cinnamomum—Species Occurring in New South Wales.—R. T. Baker, Assistant Curator of the Sydney Technological Museum, calls attention to several species of *cinnamomum* occurring in New South Wales. Two of the species have been identified, one of them a tree running up 120 feet high, with a girth of 2½ feet; the other, a tree about 90 feet high, up to 2 feet in diameter. The first,

Cinnamomum Oliveri, is known as black, brown, or white sassafras, and has been previously described in Queensland, where Mr. K. T. Staiger examined the bark and distilled some of the oil, which he finds to be so nearly the specific gravity of water as to be difficult to separate. When filtered, the oil is of a clear light-golden color, with a tinge of green, and possesses a delicious odor. Chemically, it cannot be classed with the cinnamon oil of commerce, nor with cassia oil, as it is deficient in cinnamic aldehyde, although the principal constituents of these oils (cinnamic aldehyde and eugenol) were present. Mr. Baker is of opinion that the profitble distillation of the oil is practicable, as it is only a little more difficult to obtain than eucalyptus oil. The name proposed is Oliverian oil, the tree being named after Professor Oliveri. The second species, which has been named

Cinnamomum virens, is a hitherto undescribed species, known by the bushmen as wild camphor laurel, or, on account of the high polish of the leaves and fruit, copal tree. The bark is thin, non-aromatic, and a distillation of 60 lbs. gave very little oil.—Chem. and Drugg., Jan. 29, 1898, 183.

Cinnamomum Culilawan—Yield and Characters of Volatile Oil.—Gildemeister and Stephans obtained Culilawan oil to the extent of 4 per cent. by distilling the bark of Cinnamomum Culilawan with steam. The oil had a specific gravity of 1.051, and dissolved to a clear solution in about three parts of 70 per cent. alcohol. It was found to contain 61.5 per cent. of eugenol, when determined by Thoms' method, a little methyl eugenol, and a small quantity of indefinable bodies. — Arch. d. Pharm., 1897, (*235*,) 582.

Camphor—Japanese Monopoly of the Trade.—According to a recent British consular report, there is a probability that in the near future the world's camphor trade will become almost, if not entirely, a monopoly of the Japanese government. Japan and Formosa are almost the only sources of supply, and as the lands in Formosa, where camphor trees abound, are not privately owned, the government can appropriate the camphor-producing districts without interfering with vested interests. Formerly the mode of obtaining supplies of camphor from Formosa was for foreign merchants, through Chinese agents, to advance money to the savage chiefs, in whose country the camphor trees are found, for permission to cut down trees. Stills were erected at the expense of the foreigners, who paid a tax to the Chinese authorities, and also a local tax on each picul (133 lbs.) of camphor produced. Since the island was ceded to the Japanese, there has been a fear amongst foreigners that they would be debarred from distilling or purchasing camphor in the interior, in which case they would have suffered heavy losses in abandoning the capital already sunk there. But as the present treaty with Japan—which, if strictly enforced in Formosa, would cause foreigners to retire to the treaty ports—has only two more years to run, the Japanese Government has consented to let matters remain as they were. Under the new treaty, foreigners obtain the right to settle anywhere in the interior, and will, therefore, be able to erect camphor distilleries, but it is expected that the preparation of camphor will be controlled by the government.—Pharm. Jour., Jan. 15, 1898, 63.

In this connection it is of interest to note that the production of camphor on the Chinese mainland is not by any means extinct. Mr. Augustin Henry, quoting from the Customs Returns for 1896, states that the export was: from Wenchow, 11 picules; Canton, 332 picules; Kowloon, 438 picules; Pakhis, 404 picules—all undoubtedly produced in China.—Ibid., 47.

Camphor Tree—Cultivation.—In Circular No. 12, U. S. Department of Agriculture, Division of Botany, Lyster H. Dewey gives a monograph on the camphor tree.

Cinnamomum Camphora, Nees & Eberm., which is reproduced in the Amer. Jour. Pharm. (October, 1897, 507–586), and will be profitably consulted, particularly by those interested in the cultivation of this valuable tree. The author gives a description of the tree, illustrated by a cut, exhibiting a flowering branch and the fruit in its native range, the range under cultivation, conditions of successful cultivation, propagation, planting and cultivation, distillation of the camphor and oil, outlook for a future market, etc. In a map of the United States accompanying his paper, the author shows the possible range of the successful cultivation of the camphor tree, which appears to be a narrow strip along the southern shore of the Atlantic from Charleston, S. C., throughout Florida, and along the coast of the Gulf of Mexico to Corpus Christi, then along the Mexican border to the Pacific, and thence throughout California to Oakland, except exposed situations in the mountains. For most of the secondary purposes the camphor tree may well be cultivated wherever it can be made to live; but for the distillation of camphor and oil with a commercial view, and for the production of wood for cabinet purposes, it must be grown under the most favorable conditions. The minimum winter temperature should not be below 20° F., and this minimum should be of rare occurrence. The soil, preferably sandy, and well drained, should be irrigated unless there are abundant rains. An abundance of plant food, rich in nitrogen, is required for rapid growth; but the kind of fertilizer that can be most profitably applied, will vary according to the character of the soil in each locality. In the more northern localities indicated in the author's map the camphor tree can only be grown in situations protected by buildings or by other trees. In the more southern, with out such protection, the trees may be grown either from seed or from cuttings; usually they are grown from seed, because they are grown more easily from seedlings than from cuttings. The seeds are collected at maturity in October and November, and, after drying, are packed in sharp white sand to keep them fresh until the time of planting—about the last of March. The best time to finally set out the seedlings is when they are about two years old. In favorable situations the camphor tree may be expected to grow about as rapidly as a Le Conte pear tree, and to require about as much room; but there is much uncertaintly on this point, since there are no records showing the results of regular orchard planting. In Japan, where the law requires that a new tree shall be set out for every one cut, they are not set in straight orchard rows. Similar uncertainty exists in respect to the age of the tree at which it can be cut for the production of camphor, some authorities mentioning the age of seventy or eighty years as being the youngest wood from which camphor can be extracted, while others maintain that under the present scientific management the trees will yield equally good results after twenty-five or thirty years. The author mentions that camphor of good quality has been produced in Florida from the leaves and twigs of trees less than twenty years old, one pound of crude camphor being obtained from seventy-seven pounds of leaves and twigs. The trees will endure severe prunings with little apparent injury. One-third of the leaves and young sprouts may be removed at one time without materially checking the growth of the tree. The largest proportion of camphor is contained in the older, larger roots; the trunk, limbs, twigs and leaves containing successively a decreasing quantity. But whether it will be good management to uproot the tree when it is to be finally cut, or to allow the root to sprout instead of replanting, is a question that time and experiment alone can determine.

The more or less crude process of the distillation of camphor as practiced in Japan is described by the author, and some improvements are suggested. The principles generally held to be essential in distilling camphor of good quality are: 1. The heat must be uniform and not too great, producing a steady supply of steam; 2, the steam, after liberating the camphor, must not come in contact with metal, that is, the tub and condensing apparatus must be of wood, Many improvements upon the method pursued can doubtless be made, both in preparing the material for distillation, in the apparatus itself and in the conduct of the process.

MYRISTICACEÆ.

Nutmeg—Object of Liming.—Tschirch claims that the lime layer found on nutmegs is not necessary to render the nuts incapable of germination, simple thorough drying sufficing to bring about the result. It is more likely that this lime layer is intended as a protection from the attacks of insects. The lime water in which the nuts are placed penetrates but a few cell layers into the nutmeg, and within a few minutes after the nut comes into the air, a layer of calcium carbonate is formed over the surface. Nuts with a lime coating and without were exposed to the attacks of *sidodrepa panicea* L., one of the commonest and most destructive pests. After six months all nuts not provided with the lime layer were gnawed and but one of those having a lime coating. The action of the lime is not chemical, but purely mechanical, the powder held by the wooly covering of the beetle clogs up its breathing pores, chewing apparatus and reproductive organs, finally rendering the insects incapable of performing the functions entrusted to these different organs. Therefore, liming and a frequent repetition of the process is advised.—Pharm. Review, May, 1898, 196; from Schweiz. Wochenschr. f. Chem. u. Pharm., 1898, 21.

Mace—Test to Distinguish Between the Bombay and Banda Variety.—It is stated by Solstein that Bombay mace, which has been deprived of its fat by petroleum ether, will yield ten times as much extractive to ether as the Banda variety when similarly treated. The latter, under these conditions, shall not yield more than 5.5 per cent. of ether-soluble extractive; hence an adulteration or admixture of as little as 10 per cent. of Bombay mace can be detected, as this would increase the amount of ethereal extract to 6 per cent.—Pharm. Ztg., 1897, 531.

POLYGONACEÆ.

Rhubarb—Distinction from Rhaponticum and from Rumex Hymenosepalus Powders.—L. E. Sayre communicates the results of some studies undertaken with the view to establish microscopic distinction between the powdered Chinese rhubarb and the powders of *rheum rhaponticum* and of *rumex hymenosepalus;* the latter being a probable adulterant. The paper is illustrated by a plate showing the roots of these several plants in cross section and by cuts exhibiting the principal microscopic distinction in their powders. The characteristic elements of the powdered rhubarb exhibited under the microscope are the starch grains, calcium oxalate, and massed acicular cystals of chrysophanic acid; but these are so similar in the two forms that no point of distinction is offered by them. On the other hand, the distinction between the two forms that could not be made out by the use of the miscroscope appeared very distinctly under the influence of chemical reagents. Normally, the two powders differ very materially in their appearance. The Chinese gives a fine, soft powder, of a distinctly pure yellow color and with the odor characteristically that of rhubarb; while the *rhaponticum* affords a granular, pinkish-yellow powder, the odor of which is not so strongly rhubarb-like, but more woody in character. Under the action of alkalies these differences in color become more manifest. Ammonium hydrate proved the most suitable reagent. A small amount of the powder is placed upon a glass surface and moistened with a drop or two of ammonia water, when in the case of Chinese rhubarb a dark brick-red color is developed, while the *rhaponticum* exhibits a distinct salmon-red shade. The reaction, however, serves only as a means of identifying pure specimens, not mixtures.

Adulterations with canaigre (rumex hymenosepalus) can be detected microscopically by the presence of characteristic long starch grains, which in the two rhubarbs are round or globular. With ammonia water canaigre gives a brownish color.—Amer. Journ. Pharm., March 1898, 129–135.

CHENOPODIACEÆ.

Sugar Beets—Effect of Light, etc., on their Development.—Some thirty years ago, H. Schacht had expressed the opinion that the quality of beet roots depends on the number of developed leaves and the length of life of the plant. Recent experiments made by F. Strohmer have now shown that this opinion is free from objection. Mr. Strohmer finds that sugar is produced in the leaves, either directly as reducing sugar, or from starch or other carbohydrates, and migrates through the leaf-stems to the root, the production depending on the amount of light, whilst the form and position of the leaves are of importance. When the sunlight passed through white or yellow glass, leaf production was vigorous, but with blue or red feeble; and the weight of roots under the influence of yellow light was nearly twice as great as when blue or red light was employed. The percentage of sugar under the different conditions was 7.4 to 8.1 with yellow, 6.4 to 7.4 with red, and 8.0 to 8.4 with blue light. For producing total organic substance in beet-root, rays of medium wave-length are the most favorable, but for converting the products of assimilation into sugar, the so-called chemical rays seem to have a prominent *rôle*.

The results of field experiments show that sugar production begins at an early stage in the leaves, but is greatest from the beginning of August to the middle of September, though under favorable conditions there may be a not inconsiderable accumulation of sugar even later. As from the beginning of July the sum of the percentages of water and sugar in the roots is constant, whilst the percentage of sugar in the roots increases until the leaves die, it must appear that the sugar remains in the roots when once stored there. It is only when the roots are taken out of the soil and the leaves cut off, that the sugar begins to be used up in maintaining the life of the plant, and in preparation for the second year's growth.—Pharm. Jour., Jan. 22, 1898, 67; from Jour. Chem. Soc., lxxii., 581.

PLANTAGINACEÆ.

Plantago Major, Linné—Proximate Analysis of Rhizome and Rootlets.—J. Frank Strawinski, with the view to complement the results of an analysis of the leaves of *plantago major*, L., by Rosenbaum, has made a proximate analysis of the rhizome and rootlets of the same plant with results as follows: The relative proportions of the two underground parts are 30.5 of rhizome and 19.5 of rootlets, in which proportions they were used in the analysis. The air-dried drug contained 6.92 per cent. of moisture, and yielded 24.70 per cent. (? REP.) of a reddish-brown ash, of which only a small proportion was soluble. Petroleum ether dissolved 0.57 per cent., consisting of caoutchouc, wax and fatty matter. Ether dissolved 0.41 per cent., the extract being of a dark amber color, and composed chiefly of wax—neither alkaloid nor glucoside being present. Absolute alcohol dissolved 8.60 per cent. of the material, yielding a red-brown extract, which was not again completely soluble in the alcohol, though the undissolved portion readily dissolved in water. Among the components of the alcoholic extract were a phlobaphene or traces of protocatechuic acid, glucose (1.61 per cent.) and saccharose (0.87 per cent.). Tannic was not present except in possibly slight trace. The aqueous extraction having undergone fermentation in process, the remainder of the author's results are in doubt. The drug appears to be free from albuminous matter, but contains mucilaginous matter and starch.—Amer. Jour. Pharm., April, 1898, 189–191.

OROBANCHACEÆ.

Squaw Root—Histological Character.—Lucy L. W. Wilson has made an exhaustive study of the vegetable parts of the American squaw-root, *conopholis americana*, Wallr., a parasite related to cancer-root, *epiphegus virginiana*, Barton. The invariable host of this parasite is the oak. The extreme degradation of the parasite and the intimate relation between it and the oak roots caused the author to compare it with members of the *Balanophoraceæ* and *Rafflesiaceæ*, rather than with the parasitic members of the *Scrophulariaceæ*. The seedling parasite seemed early to attack young oak roots, and steadily grew for ten to twelve years, until a large mass six inches across might be formed. This mass was chiefly characterized by the abundance of sclerenchyma patches, developed by the oak host through the irritant action of the invading parasite. The presence of the stomata on the stem and their absence on the scale leaves was pointed out, while the double circle of bundles traversing the flowering stem was peculiar in that the xylem of these faced each other.—Pharm. Review, March, 1898, 115; from Bot. Gaz. *25*, 115.

SCROPHULARIACEÆ.

Digitalis Leaves—A New Toxic Glucoside.—Replying to a criticism by Keller of his results of investigation concerning the constituents of digitalis leaves, in which Keller maintains that these leaves contain three glucosides, namely *digitoxin*, *digitonin* and *digitalin*, which are identical with those in the seeds of the plant, and that it is sufficient to determine quantitatively the amount of *digitoxin* present in the leaves in order to establish their pharmacological value, H. Kiliani calls attention to the fact that digitalis leaves contain, besides digitoxin, another heart poison in considerable quantities, which, like digitoxin, is soluble in chloroform, and which also produces, with solution of iron in glacial acetic and sulphuric acids, the blue color regarded by Keller to be characteristic for digitoxin. Kiliani proposes for the new substance, which is also a glucoside, the name

Digitophyllin. In the preparation of digitoxin by the author's method it remains undissolved in the ether used for the extraction of that glucoside. It is obtained in the form of splendid, pearly glistening, partly prismatic, partly tabular crystals, which are anhydrous, and melt at 230°–232° under partial decomposition. Elementary analysis leads to the formula $C_{32}H_{52}O_{10}$, which, if confirmed, corresponds to that of a methyl-digitoxin. While digitophyllin is rapidly split into a sugar and substance probably identical with digitoxose, by dilute acids it is hydrolyzed with difficulty, in this respect differing very decidedly from digitoxin, which is split up very rapidly (within one minute) by warm 5 per cent. hydrochloric acid. It is also far more difficultly soluble in the different solvents. The best is methyl alcohol, but even of this more than 30 parts are necessary to dissolve one part of digitophyllin In its solubilities, and in its general characters, it appears to correspond very closely with the

Digitaline crystallisée, which, as prepared by the French firm Adrian, has a composition corresponding very closely to the analytical data obtained by the author. He therefore is inclined to consider the two substances to be identical. The author, observes, furthermore, that Keller seems to take it to be a fact that

Digitalinum verum is a constituent of the leaves as well as of the seeds of *digitalis purpurea.* If this were true, Keller's dictum that it is sufficient to determine the amount of digitoxin in the leaves in order to establish their pharmacological value is faulty, since *digitalinun verum* is known to be a powerful cardiac poison. Kiliani, however, has never been able to determine its presence in the leaves, notwithstanding careful experiments made during the past years, though admitting the presence of very small quantities of a glucoside possessing close resemblance to digitalinum verum. On the other hand, he regards it as highly improbable that digitalis leaves should contain any *digitonin*, which he regards as being a characteristic constituent of the seeds, just as *digitoxin* is characteristic of the leaves.—Arch. d. Pharm., No. 61, Aug. 17, 1897, 425–429.

Digitalis Leaves—Valuation of a Large Number of Samples.—Operating by Keller's method for the valuation of digitalis leaves, which is intended to determine the amount of digitoxin present in them, Dr. G. Fromme has obtained the results shown in the following table :

Date.	Description of the Drug.	Moisture.	Crude digitoxin.		Pure digitoxin.	
			Moist.	Dry.	Moist.	Dry.
1894.	Fine powder	9.51	.395	.437	.245	.271
1895.	Fine powder	8.26	.350	.385	.180	.196
1896.	Leaves gathered in the Harz:—					
“	July	6.51	.410	.439	.305	.326
“	August	7.37	.312	.337	.292	.315
“	September	8.64	.410	.449	.320	.350
“	Stalks removed:—					
“	November	10.27	.230	.256	.230	.256
“	Thuringian leaves:—					
“	July	9.11	.595	.655	.355	.391
“	October	8.25	.285	.311	.140	.153
“	Fine powder	6.45	.462	.492	.310	.331
“	Leaf stalks	6.00	.305	.325	.210	.224
“	Leaf stalks, older	6.56	.250	.268	.135	.145
1897.	Harz leaves without stalks:—					
“	June	6.19	.300	.320	.220	.235
“	Harz entire leaves	9.05	.275	.302	.245	.266
“	Harz leaves without stalks:—		.295	.318	.215	.231
“	First year plants, July	7.11				
“	Leaf stalks, July	5.00	.440	.462	.280	.294
“	Harz leaves without stalks	8.43	.315	.344	.235	.257
“	Second year's plants, July	8.68	.175	.192	.095	.104
“	Harz flowers:—					
“	Second year's plants, July	9.12	.395	.435	.335	.369
“	Harz entire second year's plant:—					
“	Without roots, July	11.12	.135	.152	.105	.118
“	Harz woody stalk of second year's plant:—					
“	July	8.86	.155	.170	.080	.088
“	Harz entire leaves:—					
“	July	5.98	.360	.383	.285	.303
“	August	6.56	.305	.327	.210	.225
“	Thuringian leaves without stalks:—					
“	June	4.98	.410	.431	.340	.358
“	July	8.17	.370	.403	.295	.321
“	Thurginian whole leaves:—					
“	July	5.74	.395	.419	.275	.292
“	Spessart leaves without stalk:—					
“	June, early	4.15	.365	.381	.225	.268
“	June, middle	8.60	.375	.410	.325	.356
“	July, early	11.36	.325	.379	.255	.286
“	August, early	5.45	.410	.434	.300	.318
“	Tannus leaves without stalk:—					
“	June, end	7.92	.260	.282	.175	.190
“	English selected leaves:—					
“	July	3.25	.350	.362	.180	.186

—Pharm. Jour., Sept. 25, 1897, 283.

Digitalis Leaves—Rapidity of Loss in Medicinal Activity.—Prof. Böhm, while in general acknowledging the value of Keller's method for the estimation of digitoxin, warns against an absolute reliance upon it, as in his opinion the efficacy of digitalis depends not alone on the digitoxin present, but rather on the sum total of all its constituents, among which the odoriferous ones undoubtedly are of much importance. How, otherwise, would it be possible to explain the preference of experienced physicians for the fresh, recently dried and powdered leaves for internal administration, rather than resort to the infusion or perhaps even to the finely powdered drug of uncertain age. Information obtained through medical channels, leads to the conclusion that even with the utmost care in storing, etc., a fine powder loses considerable of its efficacy even in such a short period as three months. Opposed to this, however, it is of interest to note that a valuation of the fine powder shows, even after careless storage, results which are in strict conformity with those obtained by Keller. Fresh leaves of the Thuringian variety coarsely powdered, yielded as the result of three analyses the following results: 0.26 per cent., 0.265 per cent., and 0.26 per cent., average 0.261 per cent. of pure digitoxin. The same powder, after three months' storage in paper with access of air, still yielded 0.25 per cent. of digitoxin. But, as was to be expected, the latter powder failed to act when administered internally. The direction "not to be kept longer than a year" should therefore be retained.—Amer. Drugg., June 25, 1898, 342; from Gehe & Co.'s Bericht.

SOLANACEÆ.

Solanaceæ—Anatomical Characters of Distinction.—According to F. Fedde, the solanaceæ present a number of characters which differentiate them sharply from all allied orders, rendering it at the same time very difficult to distinguish the sub-orders by anatomical characters. Among the constant characters are the following: The epiderm always consists of only a single layer of cells: it is not lignified, and the cuticle is always thin. There is always a layer of collenchyma in the herbaceous parts of the stem. The vascular bundles are always collateral, and never have a protecting sheath. The vessels of the secondary xylem and the tracheids have bordered pits. In most of the genera there are very minute crystals in the cortical and medullary parenchyma and in the leptome. When these are wanting there are larger crystals formed. The pith is usually composed of thin-walled cells, and these cells, when lignified, have large round pits.—Pharm. Jour., Jan. 15, 1898; from Bot. Centralblatt, lxxii., 1897, p. 144.

Solanum Carolinense—Determination of Alkaloid.—Charles Gundlich describes the process by which he endeavored to extract the alkaloidal constituents of the fruit and of the root of *solanum carolinense*, but notwithstanding the greatest care, and though employing as much as 500 Gm. of the fruit and 1000 Gm. of the powdered root, he could obtain but traces of alkaloid. Finding that the results of Prof. J. U. Lloyd were obtained with several hundred pounds of the material, he was compelled to give up the investigation.—Amer. Jour. Pharm., Dec., 1897, 640; from Jour. Pharmacol., *4*, 225.

Belladonna Leaves—Modification of Keller's Method of Assay.—W. A. Puckner says that of the many schemes for the estimation of the alkaloidal content of drugs, the one proposed by C. C. Keller (see Proceedings 1895, 536) possesses so many points of excellence that it may be said to have replaced the older methods. While, however, not appliable to every alkaloidal drug, one of the good points in its favor is that, with slight modification, it can be applied to the assay of most of them. The most serious source of error inherent in the method consists in the employment of an aliquot portion of the ethereal solution containing the alkaloids extracted from the drug for the final determination. This, while perhaps not of much consequence in the assay of some drugs—such as nux vomica, ipecac, etc.—becomes serious in the case of drugs containing small percentages of alkaloid in a material possessing with much bulk great absorbent power. Such a material is found in belladonna leaves, and the author's present investigations have been directed toward adapting the method to their assay. Having operated on a quantity of the leaves by the original method, and having found variations in the results which proved to be in excess of those noted when assaying other drugs by the same method, the author adopted the following modification of the method, wherein, with the elimination of aliquot portion features, all its good qualities are retained, and which gave satisfactory and concordant results. The procedure is as follows:

To 10 Gm. of drug, dried and powdered as in the first method, contained in a flask of 75–100 Cc. capacity, add 50 Cc. of the light chloroform-ether mixture used in Keller's method and 5 Cc. of 10 per cent. ammonia water, cork well and shake at frequent intervals for one hour. The mixture is now transferred to a small percolator, improvised by drawing out a test tube of about 50 Cc. capacity, a rather narrow one (diameter about 20 mm.) being preferred, provided with a plug of cotton at the outlet, and the percolate received in a separator. When all has passed, 25 Cc. more of light chloroform-ether are poured into the flask, and with it the remainder of the drug transferred to the percolator; and when this has passed through, another 25 Cc. are used in the same manner. The ethereal solution in the separator, containing the alkaloids from 10 Gm. of drug, is now treated as outlined in the first method and the assay completed in exactly the same way. The results are:

	1.	2.	3.	4.	
Sample A.	0.34 per cent.	0.33 per cent.	0.33 per cent.	0.34 per cent.	Average 0.336 per cent.
Sample B.	0.53 " "	0.52 " "	0.52 " "	0.52 " "	Average 0.522 " "

While these results are slightly lower than those obtained by Keller's original method, the author has reason to believe that the higher figures of Keller are due to the fundamental error in the latter method referred to, a view which is confirmed by assays of fluid extracts prepared from the same belladonna leaves, which gave results as follows:

Fluid Extract prepared from A assayed 0.334 per cent.
Fluid Extract prepared from B assayed 0.510 per cent.

The author observes in conclusion that the main object of his communication has been to show the excellence of the Keller method, giving as it does fairly concordant results under trying conditions, and it is only in the assay of bulky drugs and such where it is necessary to use relatively large quantities, as for instance with belladonna, henbane, etc., that these modifications should be adopted.—Pharm. Rev., May, 1898, 180–183.

Belladonna.—Assay in Commercial Porous Plasters. See *Belladonna Plasters* under "Pharmacy."

Stramonium, Belladonna, Hyoscyamus—Comparative Structure.—J. O. Schlotterbeck and A. Van Zwaluwenburg communicate the results of an investigation undertaken to determine once and for all the most characteristic features of the three closely-related leaves of *Datura Stramonium*, *Atropa belladonna* and *Hyoscyamus niger*, with the view of their identification when in the form of a fine powder. These leaves are described in detail, both as regards their external features and their microscopic structure, the peculiarities of each leaf, as well as variations of generally accepted characteristics, being noted prominently. The comparative strucsture of the leaves is shown in two plates accompanying the paper, and the following resumé of characteristics is given:

D. Stramonium.	*A. Belladonna.*	*Hyoscyamus niger.*
Leaf.—Smooth, sinuate, unequal at the base; with round perforations and prominent midrib underneath.	*Leaf.*—Broadly ovate, narrowed into a petiole, entire margin smooth.	*Leaf.*—Hirsute, deeply sinuous, clasping at the base.
Powder.—Elongated palisade-cells. Stellate crystals predominating, occasionally cubes. Thick-walled, warty hairs.	*Powder.*—Crystal cells large, round and full of crystal sand or acicular crystals.	*Powder.*—Crystals prismatic, or in twin forms. Seldom, if ever, stellate.

The form of the calcium oxalate crystals is a prominent characteristic for each leaf, from which the authors have never noticed any deviation, except in the case of belladonna, in which the oxalate may appear as crystal sand or raphides. In examining unbroken dried leaves, it is easy to distinguish between the three by the shape and margin of the leaf. If very brittle, it can be soaked in 50 per cent. alcohol, and then spread out. Pharm. Arch., Jan., 1898, 1–6.

Tobacco—Historical Note.—In response to a query by Professor Flückiger, whether the statement made by Alonzo Calkins in his "Opium and Opium Appetite" (Philada., 1871, 373), to the effect that in 1639, by authority of the Virginia Assembly, there went out a decree that all the tobacco then standing in cultivated fields should be dug up and exterminated, is correctly abstracted from some official records. Prof. J. U. Lloyd has looked up this evidence, and finds this to be conclusive: that *only part of the tobacco was destroyed.* This was because tobacco was too abundant to command a good price in the market, and *not* with a view to its extermination.—Amer. Jour. Pharm., Nov., 1897, 557–559.

Tobacco—Alleged to be a Perennial.—In a recent consular report it is stated that Wilhelm Daróczi, the editor of an Hungarian tobacco journal, alleges that tobacco planters and botanists are mistaken in considering tobacco an annual plant, and he is reported to have found that it is a perennial which may be kept in full vigor for years, producing fresh leaves every year.—Pharm. Journ., Aug. 7, 1897, 119.

Capsicum—Active Constituents.—Norbitz has isolated from capsicum a crystalline body having the composition of $C_{35}H_{54}N_3O_4$, which he regards as the active principle, and which he has named

Capsacutin.—To prepare it, the powdered capsicum fruits were freed from fat with petroleum ether, and then extracted with ether. The ether was evaporated, the residue gently heated with just sufficient solution of KHO to saponify, then extracted with ether, and the latter removed. The ethereal residue was repeatedly treated with hot petroleum ether; on cooling, small crystals separated from it, amounting in weight to 0.05 to 0.007 per cent. of the extracted material. This body is neither an acid, a glucoside, nor an alkaloid. It was proved to be the active principle, as in a dilution of 1 : 11,000,000 its taste was still noticeable.—Pharm. Journ., Oct. 1897, 298; from Pharm. Woch., xiv., 525.

Japanese Chillies—A New Commercial Variety of Capsicum Fruits.—E. M. Holman calls attention to a very bright-red variety of chillies, which have during the past three or four years made their appearance in English commerce. They are the fruits of

Capsicum minimum, Rost. (*Capsicum fastigiatum*, Bl.) said to be imported from Japan, and on account of their clean, bright, and attractive appearance command a higher price than other varieties. While superior in appearance, however, these chillies are less pungent than the Zanzibar and Sierra Leone varieties heretofore found in commerce, the latter being of a yellowish-red tint, while the Zanzibar is of a dull red color, and, notwithstanding their often inferior quality, containing badly-dried fruits, stalk, and foreign matters, are both more pungent than the Japanese chillies—consequently more effective for medicinal purposes.—Pharm. Journ., Dec. 11, 1897, 519.

Mullein Flowers—Percentage of Sugar.—A. Schneegans, having his attention called to the presence of sugar in mullein flowers from the fact that its presence in the urine of a diabetic patient had been traced to the use of mullein tea, decided to re-determine the amount of sugar in the flowers. According to Rebling, sugar is present in mullein flowers to the amount of 11 per cent., but this statement was questioned by Flückiger. The author dried the flowers at 100° and repeatedly extracted them with boiling water. Solution of basic lead acetate was added to the extract to remove albuminous substances, the excess of lead was removed with the aid of sodium carbonate, and the filtrate titrated with Fehling's solution. The average amount of invert sugar thus determined was 10.4 per cent.—Pharm. Review, March, 1898, 109; from Jour. d. Pharm. v. Elsas-Loth, *25*, 17.

OLEACEÆ.

Olives—Cultivation in Italy.—In view of the efforts being made to introduce the olive in the Australian and South African colonies for commercial purposes, the British Consul at Naples, Mr. Neville-Rolfe, has prepared a very interesting report on the cultivation of the olive in Italy. The origin of the olive is first dealt with, the wild olive or oleaster being described as a tree of small and stunted growth, which can be raised from seed or from the fungoids which olives bear underground at the point where the roots separate themselves from the trunk. The fruit yields very little oil, but a cultivated olive, grafted on the stem of the oleaster, produces good results. The olive tree is evergreen and commences to flower at the base of its foliage. The best crops are obtained when the trees flower early in the spring; but they are very susceptible to cold, and if checked, the flowers do not appear until towards June, when a failure of the crop frequently follows. The various classes of olive, the uses of the oil, the methods of cultivation, together with the climatic conditions under which the tree flourishes most successfully, are described in detail by Consul Rolfe, who hopes that the report may prove useful to the colonists who are importing the tree with a view to its cultivation. Both the cultivated olive tree and the wild variety appear to be very independent of soil, and flourish equally well on a rocky hillside or on the deep soil of the plains. The enemy to the olive most dreaded by the cultivator is a small fly, the

Dacus Oleæ.—The female has a spur like a wasp, with which she punctures the fruit and deposits an egg in the lesion. These eggs develop into larvæ, which completely tunnel the olive, leaving nothing but the outer shell and the stone. It is calculated that a single fly will thus destroy three or four hundred olives. The *Coccus oleæ*, another pest, is a parasite which attacks the boughs and leaves, and lime-washing and petroleum sprays are both successful in destroying this pest.—Pharm. Journ., Jan. 15, 1898, 63.

Olives—Source of Oil in the Ripe Fruits.—According to C. Gerber, the oil contained in the ripe olive must have been formed at the expense of mannite or of some other carbohydrate. This is shown by the fact that the proportion between the carbon dioxide absorbed and the oxygen given off is less than unity. The same appears also to be the case with other fruits. The value of the proportion between the gases referred to resulting from this assimilatory process differs materially from the proportion in fermentation or in the production of acids.—Pharm. Journ., Jan. 15, 1898, 46; from Comptes rendus, cxxv., 1897.

Fraxinus Americana—Microscopic Study of the Twigs.—Rollin H. Dennison communicates in detail the results of a study of the structure of the young stems of *fraxinus americana* in a paper accompanied by a plate showing in twelve illustrations the principal microscopic elements observed. The text cannot be properly condensed, and reference must therefore be had to the original paper in Pharm. Arch., January, 1898, 6–14.

California Manna—Source of the Kind Mentioned by Father Picolo.—When Professor Flückiger visited America in 1894, he enlisted the services of Prof. John Uri Lloyd to determine the question, "What was the manna mentioned by one Father Picolo in California and alluded to by Proust (in Ann. de Chim., 57 (1806), p. 145)." With his usual thoroughness Prof. Lloyd investigated the subject entrusted to him, and communicated the results of his inquiry to Prof. Edw. Schaer, Prof. Flückiger having since died. These results are summarized by Prof. Lloyd as follows:

Sugar and two kinds of "manna" are described in western literature.

1st. Sugar.—Sugar was derived from the sugar cane, which was introduced into Lower California at least one hundred years ago. This was not "manna."

2d. Father Picolo's Manna.—Father Picolo observed a saccharine deposit on a species of grass that he called reeds (roseaux) and not shrubs (arbrisseaux) as Proust recorded the word. Of the plants likely to have yielded this manna, the *reed grasses* only are to be considered. Of the reed grasses, *phragmites communis* undoubtedly answers all the conditions that are cited by Father Picolo, and in Prof Lloyd's mind this plant is the original of Picolo's manna. This manna is (or was recently) still collected by the Indians.

3d. Manna of the Pinus.—This is yielded by *Pinus Lambertiana* of Oregon, and is cathartic as well as sweet, but no evidence exists to indicate that Picolo had any knowledge of its existence.

Finally.—Prof. Lloyd decides that without question Father Picolo described, as he saw it, the saccharine deposit on *phragmites communis* which, according to Watson, is caused by aphides.

Prof. Lloyd's paper is supplemented by a bibliography, citing sixteen works in which references are contained on the subject of Father Picolo's manna.—Amer. Jour. Pharm., July, 1897, 329–338.

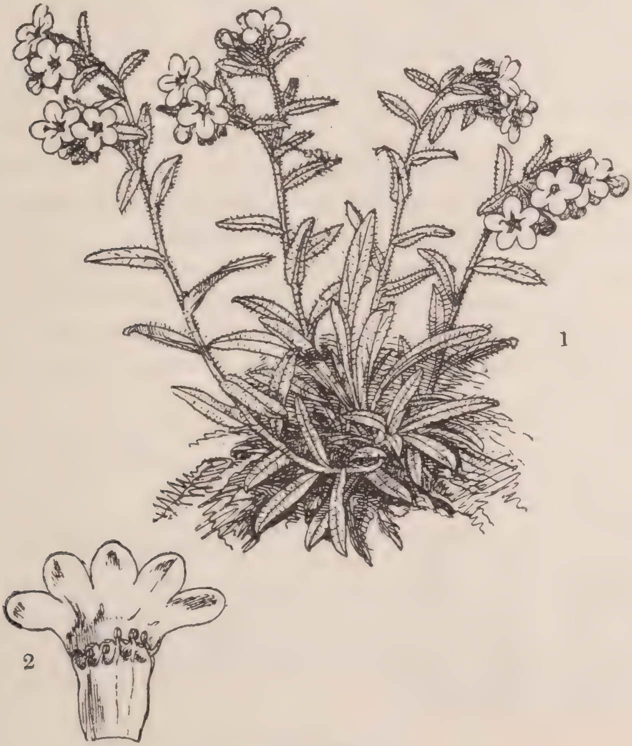
LABIATÆ.

Stachys Alpina—A New British Plant.—Cedric Bucknall has found a labiate, *stachys alpina*, growing apparently in a truly wild state on the Cotswold Hills, near Wooton-under-Edge, and accompanied by the same species of other plants with which it is associated on the Continent, thus adding another to the list of British plants.—Pharm. Jour., Oct. 30, 1897, 378; from Jour. of Bot., xxxv, 380.

BORRAGINACEÆ.

Alkanna Tinctoria, Tausch.—Botanical Description.—E. M. Holmes, after mentioning that the plant which yields the alkannet of commerce has heretofore not been described in text books and works of reference that are commonly accessible, gives a description of the plant, which he has succeeded in raising from roots sent him by Prof. L. Planchon, from the Botanic Garden of Montpelier, France. He experienced much difficulty in this, since the plants evidently require a warmer atmosphere than is usual in an English spring, and will not thrive in the open except in sheltered, warm situations. The roots in the green-house, however, quickly made a start and flowered before those in the open ground had made flow-

FIG. 69.



Alkanna Tinctoria.

ering shoots. The accompanying cut (Fig. 69) represents the plant of one-third the natural size as given in a pot by the author, though possibly smaller than the wild plant as occurring in the warmer climate of Montpelier, the entire plant being shown by 1, and a magnified corolla, establishing the relation of stamens to indentation in throat of corolla, by 2. The flowers are about the size of those of *anchusa sempervirens*, but of a more ultramarine blue color. They have no scales in the throat of the corolla, differing in this respect from the genus cinchona, but the tube of the corolla has on the external surface two rows of indentations which cause a slight bulging of the corolla between the brown anthers. There are very short filaments, three of the anthers being situated above the upper row of indentations, and two above the lower row, and the throat of the corolls is lined with minute glandular hairs. The stigma in the flowers examined by the author is on a level with the two lower stamens. This, he observes, may possibly be an arrangement to provide self-fertilization in case the flowers are not cross-fertilized, or it may be an adaptation to direct a particular insect to the honey which lines the corolla tube. The leaves are of a slightly greyish-green tint and are covered with hispid hairs and very short-stalked glands, the latter being visible only under a good lens. The author observes that the only good figure of *alkanna tinctoria* that has hitherto come to his notice is given by Berg in "Offizin. Gewächse" (plate xxiv. c). He also calls attention to the fact that other boragineous plants have red roots which can be used and substituted for alkanet, and he enumerates the following plants, the roots of which are so used: *alkanna tinctoria*, Tausch.; *arnebia thibetana*, Kurz; *arnebia tinctoria*, Vahl; *lithospermum erythrorhizon; macrotomia benthami*, D. C.; *macrotomia perennis*, Benth.; *onosma emodi*, Wall.; and *onosma hookeri*, Clarke.—Pharm. Journ., July 24, 1897, 61–62.

Blue Weed—Active Constituents.—August Dresher has made some chemical and physiological experiments upon a specimen of the so-called "blue weed,"

Echium vulgare.—The results, which so far as the chemical investigation is concerned, are incomplete, as well as the physiological action of the partially purified substances—undertaken by Dr. Otto Leis—point to three substances as probably constituting the active principles of the plant, viz., methyl-strychnine, curarine or picrotoxin.—Proceedings New Jersey Pharm. Assoc., 1897, 51–54.

BIGNONIACEÆ.

Gelsemium sempervirens—Habitat.—F. H. Knowlton communicates an interesting paper on the habitat of *gelsemium sempervirens:* He says that the "yellow jessamine" is as dear to the Southern heart as the trailing arbutus, or mayflower, is to the resident of New England. It has a number of common names, such as Carolina jessamine, Carolina wild woodbine, and evening trumpetflower. It grows in moist, rich woods and thickets, from Eastern Virginia to Florida, thence to Texas, Mexico and Guatemala, mostly near the coast. Concerning the flowers, which are produced in March and April, the author says that they are usually very fragrant, but in exceptional cases, for reasons unexplained, they are without fragrance.—Merck's Rep., Dec. 1, 1897, 725.

APOCYNACEÆ.

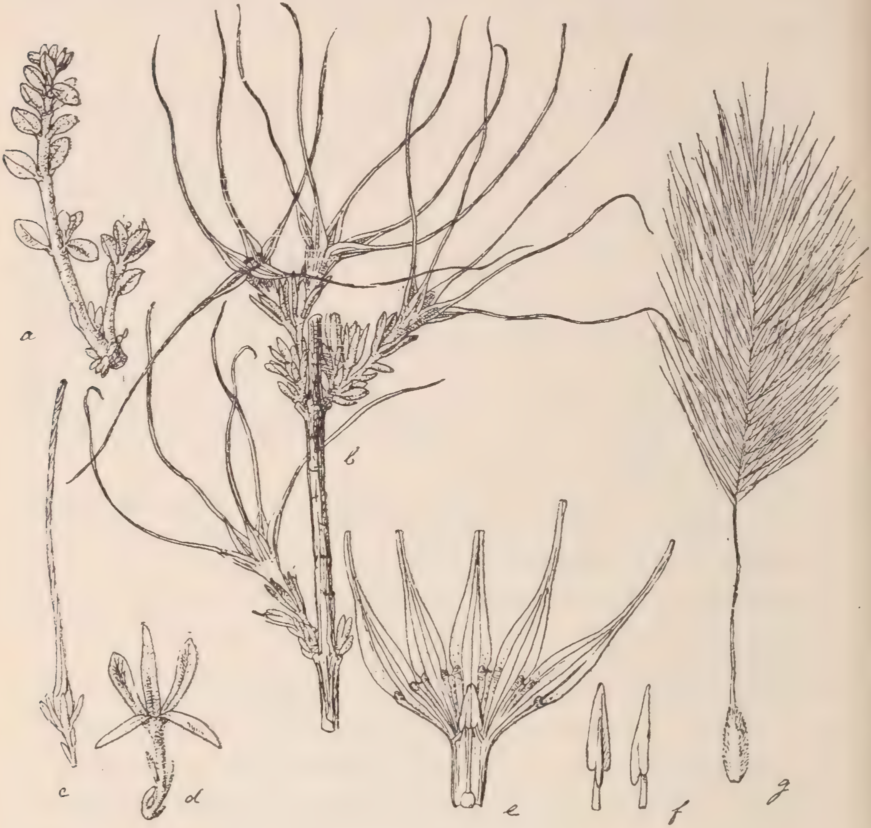
Strophanthus Hispidus, D. C.—Botanical and Pharmaceutical Description.—Prof. John Uri Lloyd contributes some historical notes on strophanthus hispidus D. C., and gives a description of the principal botanical elements of the plant, the different organs as well as a branch of the plant —in natural size—being shown in a plate accompanying his paper. He briefly reviews the chemistry of the drug in chronological sequence, the history of its introduction into the various pharmacopœias, and its consequent legitimate use as a medicinal agent. Its use as one of the constituents of arrow poisons of the native Africans, as well as some general information on the subject of arrow poisons, constitute a considerable portion of the paper, to which a voluminous bibliography is appended.—West. Drugg., Sept., 1897, 403–406.

Strophanthus Hispidus and Kombé.—Presence of *Choline* and *Trigonelline* in commercial *strophanthin* derived from their seeds. See under "Glucosides and Neutral Principles."

Strophanthus Glaber. — Character of glucosidal constituent, *ouabin*, which see under "Organic Chemistry."

Strophanthus Nicholsoni — A New Species.—For some years E. M. Holmes has endeavored to obtain herbarium specimens in flower and fruit of the species of *strophanthus* yielding the kombé seed of commerce, and the "white woolly" variety of commerce. Through Dr. T. G. Nicholson, he has now obtained the flowers and fruits of a *strophanthus*, the seeds of which appear to be identical with those of the "white woolly" variety, and which proves to be a new species. This Dr. Holmes proposes to designate as *Strophanthus Nicholsoni*, the accompanying cut (Fig. 79), exhibiting its character of distinction from other species. According to Dr. Nicholson, it is a small bush or shrub about 3 or 4 feet high, having the habit of growth of the flowering currant (*ribes sanguineum*, Pursh), but the main branches curve slightly outward, and the slender twigs are patent at an obtuse angle. It grows in alluvial soil at the base of granite hills, intersected with quartz veins. The specimens in flower were gathered at the end of October, the pods of the previous year opening on the bush at the same time, and in December the flowering is over and the seeds are scattered. At the time the plant flowers there are no leaves formed, or they are only very slightly developed. The general color of the flower is of a pink hue with a tinge of dusky fawn. The throat of the corolla is yellow, with dark purple lines and spots. The thread-like corolla segments, or "streamers," are of a pinkish purple. The fruit is of a purplish plum color, and marked with linear oval lenticels, some of which are nearly 1 Cm. long. The plant, which was found in the district extending from Lusengasia in a southwestern direction to the Loangwa river, is most nearly allied to *S. Schuchardti*, Pax., and resembles *S. sarmentosus* in flowering before the leaves appear, from which again it differs in its erect bushy habit, small flower and more slender flowering branches.—Pharm. Journ., Sept. 4, 1897, 209.

FIG. 70.



Strophanthus Nicolsoni.

Curare—Commercial Varieties.—The various forms of curare heretofore found in commerce are described by Boehm as follows:

1. *Tube-Curare*, also called "Para-Curare," comes from the Amazon. It is preserved in hollow bamboo canes, and consists of a dark brown subtance, which contains well-formed crystals up to 2 Cm. in length. It

contains about 11 to 15 per cent. of moisture, and is soluble in water and in dilute alcohol to about 85 per cent. The ash amounts to 12.3 per cent. The lethal dose on a 1 kilo rabbit varies between 6 and 12 milligrammes. The aqueous solution has an acid reaction, depositing a flaky sediment even after filtration. This kind of curare contains an inactive base curine, and about 9.2 to 11.8 per cent. of tubocurarine, which is the poisonous constituent. The crystals referred to were found to be quercetin.

2. *Gourd-Curare.*—This has now almost entirely disappeared from the European market. It is derived from *strychnos toxifera*, Benth., and is a dark brown substance, containing 5 to 12 per cent. of moisture. It is soluble in water from 34 to 75 per cent. The lethal dose pro 1 kilo weight lies between 1.5 to 3 milligrammes. The aqueous solution is faintly acid. It yields 6.1 per cent. of ash. The active principle is curarine and an alkaloid soluble in ether.

4. *Jar-Curare*, is derived from *strychnos castelnœi*, Wedd., but has also disappeared from the market. Frequently it possesses a peculiar aromatic odor. It contains 8.33 per cent. of moisture and 7.9 per cent. of ash. The solubility and toxicity of various preparations differ considerably. It contains three bases—protocurine having a slight curare action, the formula for which is $C_{20}H_{23}NO_3$, the non-poisonous protocuridine, and protocurarine, which is extremely poisonous and much more intense in action than curarine. 0.24 milligramme is a lethal dose for 1 kilo for body weight.—Pharm. Ztg., 1898, 41.

Asclepias Curassavica—Insecticidal Properties.—Attention is called in "Kew Bulletin" (October, 1897), to the insecticidal properties of *asclepias curassavica*, a common weed which grows everywhere about the Isthmus of Tehuantepec. It is used by the Indians there to keep away vermin, especially fleas, and is reported as being most successful. Rough brooms are made of the plant, and the floors and walls of their huts are swept with them, after which they are not troubled with fleas for a considerable time. The Indian name of the plant is "Chilpati."—Amer. Journ. Pharm., Dec. 1897, 640.

SAPOTACEÆ.

Rubber-Yielding Plants—Coagulation of Latex.—R. H. Biffen, with the view to determine the phenomena that attend the coagulation of the latex of plants when exposed to the action of air, water, alcohols, acids, alkalies, and other substances, selected rubber-yielding plants on account of the abundance of latex, and because the various processes used in the preparation of crude rubber seemed likely to throw some light on the subject. Para rubber is prepared by exposing a thin layer of latex of *hevea brasiliensis* and other species of *hevea* to the action of the smoke of burning Attalea nuts. Coagulation is immediately brought about, resulting in the formation of a soft curdy mass of rubber which on drying becomes tough and elastic. The explanation that this is due to the evaporation of water is inaccurate, because no loss of weight follows. On burning the nuts and condensing the smoke, two layers of liquid were collected, the upper consisting mainly of acetic acid, the latter of creosote and pyridine derivatives. On adding acetic acid to the crude latex, coagulation immediately occurred; this must be due to the action of the acid. The same latex is itself alkaline, and the addition of a solution of ammonia preserves it indefinitely from a spontaneous coagulation. On the other hand, in the acid latex of *castilloa elastica*, a tree which grows in Mexico and Nicaragua, alkalies cause coagulation. For this purpose the Indians use a decoction of the stems of the moonflower (*ipomœa bona-nox*). In the case of *hancornia speciosa*, in order to produce "mangabeira" rubber, common salt is added; in the preparation of "balata," from *mimusops globosa*, in Venezuela and Trinidad, coagulation is effected by boiling. As the milkiness of latex is due to the presence of innumerable small particles of caoutchouc, in themselves soft and sticky, it was separated by a centrifugal machine, rotating 6000 times per minute. The separated particles were shaken with water and again separated. On diffusing them again through water and adding an alkali no coagulation occurred. From the failure of the chemical reagents employed to bring about the clotting of the washed particles, the author infers that no chemical change occurs in the rubber itself, and that the cause of the phenomenon must be looked for in the medium in which they are suspended. J. R. Green has found albumin, globulin, albumose, and peptone in several rubber-yielding latices. Biffen proves the presence of proteids in the clear solutions, by the xanthroproteic reaction, after separation of the rubber particles. Thus in *hevea brasiliensis* an albumin, present in the latex, is clotted by heat and acetic acid; a globulin in *manihot glaziovii* is coagulated on heating to 74 to 76° C.; the acid latex of *castilloa elastica* contains an acid albumin which is precipitated on neutralization. These coagula gather up the rubber, and possibly the starch particles, just as white of egg gathers up suspended particles when clotted for the purpose of clearing jellies.—Pharm. Journ, June 25, 1898, 585; from Annals of Botany, vol. xii., No. xlvi., pp. 165–71.

Caoutchouc—Preparation from the Roots of Plants in Africa.—It is stated in "Tropenpflanzer" (II. 1898, No. 2) that plants belonging to the genus

Carpodinus or *Clitandra*, growing on the Kwango, a tributary of the Congo, furnish caoutchouc from the roots by the following method: After pulling up the shrubs, which are only from 20 to 60 centimeters high, they are allowed to wilt. The roots, cut in pieces about 20 Cm. long, are tied into bundles, exposed for five or six days to the sun, and then macerated in water for about ten days, so that the woody portion may become completely decomposed. The mass is then beaten with sticks, and then further cleaned by boiling and beating. On drying, it forms pieces about an inch long, and in this form—containing about 50 per cent. of caoutchouc—it is supplied in the market.—Apoth. Ztg., 1898, 170.

India Rubber—Cultivation in Africa.—According to a recent British Consular Report, the cultivation of the India-rubber tree — *manihot glaziovii*—is making considerable progress in the German colony of Togoland. The trees are raised from seeds only, and grow with astonishing rapidity, bearing seeds in ten months after sowing, which, when sown in their turn, come up in from three to four weeks. In the mountains a considerable amount of India rubber is obtained from the Landolphia, another source being the *kicksia africana*, which grows in the neighborhood of Nkonya, from either cuttings or seeds. Efforts are being made by Dr. Woeckel, a naturalist, to instruct the natives in the art of cultivating rubber-yielding plants, and it is hoped as a result that the industry will soon make good progress.—Pharm. Jour., Nov. 6, 1897, 416.

Gutta Percha—Chemical Components.—In a summary of what is known about gutta percha, Dr. E. F. A. Obach shows that the purified substance probably consists of a hydrocarbon—pure gutta—having the formula $C_{10}H_{16}$; albane, $C_{10}H_{16}O$; fluavile, $C_{40}H_{64}O_3$; and a variable component named guttane. Pure gutta possesses all the good qualities of gutta percha in a much enhanced degree, becoming soft and plastic on heating and hard and tenacious on cooling, without being in the least brittle. The resins appear to be simply accessory compounds, which have a decidedly detrimental effect when they preponderate. Water, wood fibres, bark, sand, etc., occur, of course, merely as mechanical impurities of gutta percha.—Pharm. Journ., Jan. 15, 1898, 46; from Journ. Soc. of Arts, xlvi., 122.

STYRACEÆ.

Liquidambar Styraciflua, L.—Characters of the Volatile Oil of the Leaves.— Schimmel & Co. (Report, April, 1898, 53) observe that the leaves of the sweet-gum tree have, when bruised, a peculiar turpentine-like odor. When distilled, they yielded only 0.085 per cent. of oil, having a greenish-yellow color, a spec. grav. of 0.872, the optic. rotat. —38°45′, the saponification number 0.9 and the acetylization number 25.2. The oil contains, besides terpene, borneol and bornyl acetate; the odor recalls that of the oil of *abies pectinata*, D. C.

Storax—Origin in the Plant.—According to the investigations of J. Moeller, storax is not, as has been supposed, a product of the bark, but is a pathological secretion of the young wood. The author has ascertained this both by an examination of the tissues found in oriental storax and by that of the stems of the American *liquidambar styraciflua*, which had been cut in order to cause a flow of the balsam. The latter tree is cut at intervals of about three weeks during April, May and June, with the result that the bark becomes raised from the wood, and that the wood appears dead. The tissues of the dead wood become filled with a yellow matter, and its vessels, as well as the more central uninjured vessels, contain thyloses, while the new wood is formed of a pathological parenchyma, in which schizogenous secreting cells appear, and ultimately unite to form lysigenous lacunæ containing freshly-secreted balsam—this being a development at present unknown in other plants.—Pharm. Post, Sept. 19, 1897.

Sumatra Benzoin—Pharmaceutical Value of Commercial Specimens.—The large percentage of residue, over 22 per cent. of the benzoin taken when making the simple tincture induced Thomas Dunlop to examine a number of commercial samples with the results shown in the table, his results possessing the greater value since there exists no authoritative information in standard works on materia medica from which the extent to which such impurities may occur may be computed. From the fact that "Sumatra" benzoin is always supplied when benzoin is ordered, this variety alone was contemplated in the examination, only a single sample of "Siam" benzoin having been examined by way of comparison. This latter was found to be practically *entirely* soluble in alcohol, a residue of only 5 grs. per ounce (about 1 per cent.) remaining, whereas the residues (barky and woody matter), in the cases of the Sumatra samples amounted to from 8 to 30 per cent.

No.	Price. s. d.	Labeled.	Residue in grains from 1 oz. of drug.	Percentage of Impurity.	Grs. required for 1 oz. soluble matter.	Remarks.
1	2 8	——	97	22.17	562	Second quality.
2	2 6	——	132	30.	626	Only quality. Described as white-fine.
3	3 8	Opt.	35	8.	475	Highest price.
4	3 6	Elect.	100	22.85	567	Described as "Elect."
5	2 6	Opt.	120	27.42	602	Second price.
6	3 6	——	48	10.9	491	Highest price.
7	2 6	——	100	22.85	567	Only quality.
8	2 3	Opt.	126	28.8	614	Best quality.
9	1 5	——	56	12.8	501	Second quality.
10	4 0	Opt.	76	17.37	529	Highest price.
11	3 4	Opt.	70	16.	520	" "
12	3 6	Opt.	64	14.62	512	" "
13	6 0	Siam.	5			

—Trans. Br. Pharm. Conf. (Yearbook of Pharm.), 1897, 370–374.

Benzoin—Examination of Commercial Samples.—Referring to the preceding paper, J. Evans discusses the descriptions of benzoin given by the British and other Pharmacopœias as well as works of reference, such as the "Pharmacographia," the National Dispensatory, &c., and finds them all deficient in defining a limit to the extent to which impurities—substances insoluble in alcohol—may be present. He has examined nine samples of commercial benzoin, with results shown in the following table:

Sample	Description.	Percentage of Matter Insoluble in Spirit.	Percentage of Ash Yielded by the Insoluble Matter.
A	Good commercial Sumatra	8.54	4.8
B	“ “ “	10.25	4.2
C	“ “ “	9.45	4.9
D	“ “ “	7.13	3.9
E	Seconds	10.67	6.1
F	“	10.16	5.4
G	Very fine Black Siam	1.3	20.1
H	Commercial Siam of good quality	2.48	11.9
I	Penang	6.17	6.6

The conclusions drawn by the author from these results are: that commercial benzoin contains a large percentage of matter insoluble in spirit, in form of bits of bark, wood and inorganic matter; that a standard should be fixed in the B. P. for the amount of matter insoluble in spirit, which should not exceed 10 per cent.; and that Siam benzoin, containing the least amount of impurities insoluble in alcohol, should be used in all official preparations.—Pharm. Jour., May 28, 1898, 507–508.

ERICACEÆ.

Arctostaphylos Uva Ursi—Yellow Coloring Matter of the Leaves.—A. G. Perkin, after mentioning the constituents that have heretofore been determined in the leaves of *arctostaphylos uva ursi*, states, as a result of investigation, that there is also present a yellow coloring matter of the composition $C_{15}H_{10}O_7$, crystallizing in glistening yellow needles; this forms an acetyl-compound, $C_{13}H_5O_7Ac_5$, melting at 188–190°. On fusion with alkali, phloroglucinol and protocatechuic acid were formed. Though resembling quercetin in these points, it has the property of forming deep green solutions with dilute potassium hydrate. Regarding this reaction as due to impurity, the coloring matter was converted (*a*) into a sulphate, and (*b*) into an acetyl-derivative, and the coloring matter regenerated from these, but in each case it was unaltered in its behavior towards alkaline solutions. Oxidation in alkaline solution did not destroy the green coloration until complete decomposition of the coloring matter has taken place. The presence of ellagic acid has also been detected, and thus besides gallotannin, ellagitannin is also present. Broach leaves contain the same coloring matter.—Chem. News, May 5, 1898, 208; from Proc. Chem. Soc., April 21, 1898.

Kalmia Latifolia—Analysis of the Root.—Harry Matusow has analyzed some roots of *kalmia latifolia*, collected in July, 1896. The *petroleum* *ether extract* (0.34 per cent.) consisted of caoutchouc, wax and a resin-like substance. The *ether extract* (0.89 per cent.) contained resin, phlobaphene, and a substance corresponding to the previously observed constituent of the root, *andromedotoxin*. The *absolute alcohol extract* (3.68 per cent.) contained phlobaphene, tannic acid, and traces of glucose and saccharose. The *water extract* (3.2 per cent.) contained mucilage, albuminous matter, glucose (a trace) and saccharose. The *alkaline water extract* (5.44 per cent.) contained mucilage and albuminous matter, the *acidulated water extract* (1.17 per cent.) contained pararabin, while starch, determined in a separate portion of the root—in two examples—was contained to the average amount of 11.40 per cent. The cellulose and allied substances, determined by differences on ignition, amounted to 47.40 per cent., the moisture to 5.06 per cent., and the ash to 1.24 per cent., containing aluminum, potassium, calcium, magnesium, iron, manganese, hydrochloric, sulphuric and phosphoric acids.—Amer. Jour. Pharm., July, 1897, 341–343.

COMPOSITÆ.

Grindelia Robusta—Histological Characters.—John Glassford contributes a paper on the pharmacognosy of grindelia robusta, the first portion of which, on the botany and histology of the drug, appears in "Merck's Report" (June 15, 1898, 362–364). Among the illustrations accompanying the paper, those showing the histological characters of the powder are highly interesting. In addition to the elements of the stem, it contains the elements of the leaf and flower, the following being easily defined under the microscope:

From the stem: bast fibres, ducts, wood fibres and tracheids, and parenchyma.

From the leaf: leaf epidermis with stomata, resin glands.

From the flower: pollen grains, flower parenchyma, sclerenchymatic tissue from the seed, and fat globules.

From all parts: fragments of resin.

These elements, together with others observed in cross-sections of the stem, are severally described.

Senecio Jacobæa—Utility in Functional Amenorrhœa.—Dr. W. E. Fothergill calls attention to the utility of the common "ragwort" in restoring the menstrual function in women suffering from functional amenorrhœa, as recorded by Murrell, Dalché and Heim, and by Bardet and Bolognesi, and now records his own experience with a fluid extract of senecio jacobæa, made by Mr. Kirkby (see under "Pharmacy"). He finds senecio, in contradistinction of our present emmenagogues, to have direct action as such, and to have a wide range of utility. Most of the emmenagogues having an indirect action may, if given during pregnancy, cause abortion; while senecio may be safely given to any patient whose chief symptoms are amenorrhœa, before subjecting her to the unpleasantness of a physical examination.—Pharm. Jour., Dec. 18, 1897, 543.

Ayapana—Introduction as a Substitute for Tea.—Among the recent additions to the Museum of the Pharmaceutical Society of Great Britain, E. M. Holmes calls attention to "ayapana," which has been introduced as a substitute for tea as a beverage. The drug consists of the leaves of

Eupatorium triplinerve, Vahl. (*Eupatorium ayapana* of the older writers), a native of tropical America, where it has long been used, particularly in Brazil, as a sort of panacea or domestic remedy for everything. It has, when dried, a somewhat agreeable color, and a faintly aromatic, slightly bitter and astringent taste. However ayapana may be regarded as a sure cure for many diseases, it is certain that in whatever country it has been introduced as a tea it has come to stay—so in Mauritius, in Java, Ceylon, India, etc., where it remains in use, chiefly as a tea, which is considered to be especially useful as a stomachic tonic in indigestion, and finds other uses. The plant has been chemically examined, presumably by Mr. D. Hooper, its prominent constituents being, according to a statement in the "Pharmacographia India" (ii, 247), an odorous colorless volatile oil, and a crystalline neutral principle—*ayapanin*—which is easily sublimed at 159° to 160°, and condensed in brilliant scales and rhombic prisms. It is practically insoluble in water, but soluble in ether and alcohol. In consideration of the present attempt to introduce ayapana as a tea-substitute, and of the probability that it contains some constituent that has more or less beneficial physiological effects, Mr. Holmes considers it well worthy of further investigation by physiologists and chemists.—Pharm. Journ., Dec. 11, 1897, 519–520.

Amphiachris Dracunculoides, Nutt.—Medicinal Value.—Dr. E. G. Anthony observes that on the plains from Kansas to Texas a plant resembling at first sight the golden rod, is found in abundance. It is *amphiachris dracunculoides*, Nutt., a plant closely related to *gutierrezia* and *grindelia*. It is copiously branched, the branches and branchlets each being terminated by a single small head and forming an effusive flat-topped corymb. The leaves are narrowly linear, and the small flowers which appear in autumn are yellow. The upper portions of the plant are the parts employed. It is said to be a quickly diffusive stimulant and tonic, especially indicated in hypertrophic, scrofulous and syphilitic rhinitis, follicular disease of the nasal pharynx, etc., and Dr. Anthony says that it is indicated in all those conditions of the naso-pharyngeal mucosa where there is a lack of tonicity.—Bull. Pharm., Dec., 1897, 557; from Indianapolis Polyclinic.

Burdock—Use as a Vegetable.—J. Inazo Nitols calls attention to the use of burdock as a vegetable. Even in England, he observes, the alimentary value of burdock was not always despised. It is mentioned by Sowerby in his "Useful Plants of Great Britain," that the stalks of the burdock, cut before the flowers open and stripped of their rind, form a delicate vegetable when boiled, similar in flavor to asparagus, and that in the raw state they may be eaten with oil and vinegar as salad. But it is in Japan where the burdock is recognized as being a useful alimentary plant. While it grows wild in several places, it is there extensively cultivated, and every one eats "Gobo," the usual appellation of the plant, although a more refined and almost obsolete name is "Kitakisu." Thousands of acres are devoted to the culture of this plant, which in most books on botany in the English tongue is described as a pestiferous weed, for the destruction of which many an agricultural bulletin gives careful instruction. No less than seventy-two million pounds of burdock roots, which average about 350 grains in weight, were produced in Japan according to the official statistics of 1888. This immense production is not to be wondered at when it is recollected that burdock ranks high in the scale of nutritive plants, standing higher in the amount of nitrogen than potatoes, beets, carrots, or turnips, and is, in fact, approached by few roots or tubers. The following table shows its chemical composition compared with that of the vegetables mentioned :

	H_2O	N	Ash	K_2O	Na_2O	CaO	MgO	P_2O_5	SO_3	SiO_2	Cl
Potatoes	750	3.4	9.3	5.8	0.3	0.3	0.5	1.6	0.6	0.2	0.3
Sugar Beets ..	815	1.6	7.1	3.8	0.6	0.4	0.6	0.9	0.3	0.2	0.3
Turnips	720	1.8	6.4	2.9	0.6	0.7	0.2	0.8	0.7	0.1	0.3
Carrots	850	2.2	8.2	3.0	1.7	0.9	0.4	1.1	0.5	0.2	0.4
Burdock	738	5.6	10.5	4.3	0.2	1.1	2.0	0.9	0.7	0.1	

In the course of cultivation in Japan many varieties have developed, but the best known among them are few in number. They are usually named from the location where they were first developed or where they thrive best, such names being "Takinozawa," "Proura," "Yamato," and "Horikawa," the last two being the kinds most popular, and apparently only different names for the same variety. The author describes the method of cultivation, and also gives some information concerning the Japanese method of preparing burdock roots for food. The skin being scraped or peeled off, the roots may be sliced into long strips or cut into pieces of less than an inch in length and boiled with soy, salt, or Spanish pepper, to impart savor to them. Or, if boiled alone, they may afterwards be browned in sesame oil, which of itself imparts flavor. The boiled roots may be mashed, formed into cakes, and fried in the same manner as oyster plants. They may be eaten dressed as salad, and they are sometimes pickled in miso.—Amer. Jour. Pharm., Aug., 1897, 416–420 ; from Gard. and Forest, *10*, 143.

RUBIACEÆ.

Cinchona—Localization of Alkaloids.—Dr. J. R. Lotsy has investigated the distribution of the alkaloids in *cinchona calisaya*, *c. ledgeriana* and *c. succirubra*, and finds that they occur in the parenchyma, but not in the sieve-tubes of the vascular bundles. Under normal conditions they are found only in living cells, and never in those which contain also calcium oxalate. In young organs the alkaloid is, as a rule, dissolved in the cell-sap, while in the older organs it occurs as a solid amorphous mass within the cell. Very active organs—such as the cambium, or the extreme tip of the growing point—do not usually contain any alkaloid, but it occurs in large quantities a short distance from these locallties. In the leaves and petals the amount of alkaloid decreases with age.—Pharm. Journ. Nov. 27, 1897, 460; from Bot. Centralbl., 1897, 395.

Cinchona Cultivation—Alkaloidal Content of Grafts, Seedlings and Cuttings.—T. Van Lursum, of the government cinchona plantations in Java, has concluded after much research concerning the alkaloidal constituents of and relative values of bark grown from grafts, cuttings and seedlings, that (1) there is no certainty whatever that the grafts or cuttings of trees having a known percentage of alkaloid will produce the same percentage as the mother tree. (2) Seedlings of *c. ledgeriana* will no doubt produce less in the first four years than *ledgeriana* grafts; but the yield of the former will be about double that of the grafts after the lower branches of the latter have been picked. (3) Cuttings produce less than either seedlings or grafts, even though the root-bark of the cutting can also be used. —Chem. and Drugg., 1898, 591; from Naturk. Tijdschr. voor Ned. Ind.

Cinchona—Cultivation in Portuguese West Africa.—It is stated in "Chem. & Drugg." (1898, 591), that the plants of *cinchona succirubra* and *c. officinalis*, given to the Botanic Gardens in Coimbra, in Portuguese West Africa, between 1869 and 1871, have since been applied to the cultivation in that territory with such success that, at the end of 1887, 1,600,000 cinchona trees, mostly *c. succirubra*, were flourishing. The best bark is obtained from trees growing at an altitude of 3,300 feet.

Cultivated Cinchona—Quantity and Quality.—The "Chem. & Drugg." (Jan. 29, 1898, 163), observes that the quantity of quinine in the cinchona-bark offered at the ten Amsterdam auctions of 1897 fell considerably below that offered in 1896, and would, indeed, have carried us back to the figures for 1895 but for the huge supplies offered at the December sales. Weight for weight, the supplies of bark actually fell below those of 1895, as well as of 1896, but it is too often forgotten, in speculating upon the future of the bark-supply, that while the output of the island of Java is falling, the alkaloidal richness of the bark continues to rise. Thus, the average richness (in quinine) of the Java manufacturing bark in 1897 shows an increase of nearly 5 per cent. on that of the year before, and of over 43 per cent. since

1889. The actual average unit for each year, and its percentage increase upon its predecessor during the past seven years, are shown in the subjoined table:

	1891.	1892.	1893.	1894.	1895.	1896.	1897.
Average unit per cent…………	4.08	4.50	4.60	4.93	5.01	5.48	5.73
Per cent. increase on the year before	2	10	2	7	2	9	5

From the bottom line it will be noticed that the average unit has generally taken a big step forward every second year. If this tendency be maintained in the same ratio during the twelvemonth just commenced, the average quinine content of the manufacturing bark offered at Amsterdam this year will be well over 6 per cent. Hitherto such a unit has only been attained in the auctions of August and September, 1897, and a few years ago it would have been looked upon as wildly improbable.

Cephaëlis Ipecacuanha—Monographic Description.—Prof. John Uri Lloyd contributes a monograph on *cephaëlis ipecacuanha*, in which he describes the botanical character of the plant, its cultivation, the collection of the drug root, its chemical constituents, history, pharmacology and adulterants. The test is accompanied by a handsomely executed plate showing the plant and the principal organs in natural size. The author deals with each subject in chronological sequence. He mentions no less than eight synonyms under which the plant has been described, the generic name *uragoga* assigned by Linnæus in 1731 having, as pointed out by Baillon in 1879, the right of priority over the accepted generic name of *cephaëlis*. Allied species that are sometimes found in commerce under various trade names are: *psychotria emetica*, Mutis; *richardsonia scabra*, L.; *ionidium ipecacuanha*, St. Hilaire. The paper and an extensive bibliography may be consulted in West. Drugg., August, 1897, 346–350.

Ipecac—Histological Characteristics of the True Root and its Adulterants.—Albert Schneider communicates the results of a study of ipecac and its principal adulterants, the microscopic elements of the more important ones being shown in drawings accompanying his paper. It has been shown by Jaguemet that almond meal, licorice, wood fibre, flour of cereals and starches, mineral substances, and even tartar emetic have been used as adulterants of the powdered drug, but the author considers beyond doubt that the principal sources of its adulteration are roots of plants related to the official ipecac. The microscopical elements that may serve for their recognition and distinction are briefly given as follows: 1. *Rio ipecac* is recognized by its characteristic starch-grains; the isodiametric parenchyma cells and the tracheids, which are of nearly uniform size. The vessel-like tracheids have nearly circular openings. 2. *Carthagena ipecac* is recognized by its large simple starch-grains. The openings of the vessel-like tracheids are oblong. 3. *Cephaëlis tomentosa* is recognized by its highly compound starch granules; the presence of large and small tracheids and large acicular crystals. 4. *Gohnese ipecac* is recognized by its small parenchyma cells; the resin-cells; small tracheids and rather abundant cork of rectangular and hexagonal cells. 5. *Richardsonia ipecac* closely resembles *cephaëlis tomentosa*. The pores of the tracheids are elongated; deficient parenchyma; does not contain brown-waxy substances, and the cell-walls are not colored. 6. *Richardsonia brasiliensis* is recognized by its large, mostly simple starch-grains and the large and small tracheids. 7. *Asclepias tuberosa* is recognized by its stone-cells, reticulate ducts and tracheids. 8. *Euphorbia ipecacuanha* is recognized by the simple starch grains; wax-cells, and the absence of tracheids.—Amer. Drugg., July 10, 1897, 3.

Ipecacuanha—New Falsification.—Georges Dethan describes two roots which he has found mixed with ipecacuanha. One of them he has identified as that of *polygala violacea*, St. Hil. The lower part of the root bears a considerable resemblance to that of undulated ipecacuanha (*richardsonia brasiliensis*), whilst the upper pieces are striated like those of *psychotria emetica*. The *p. violacea* has a creeping root of a deep brown color, rather thicker than a goose quill and 10 to 20 Cm. long, becoming thinner towards the extremity. It is coarsely striated, and the fracture is whitish and starchy. The root branches, which are numerous, have a yellowish color, are more or less twisted and smooth and have an amylaceous fracture; the bark is frequently cracked transversely so as to expose the central cylinder. The roots differ, however, from those of *richardsonia* in being dichotomously branched. The stem of *psychotria* is dark brown and smooth, and nearly as large as the root, but that of *polygala violacea* is paler, yellowish, and rugose, and is more slender than the root. The cork is composed of four to eight layers of elongated cells, filled with a brownish coloring matter. The cortical parenchyma consists of large elongated cells, becoming shorter and more rounded towards the centre of the root. These cells are filled with densely crowded starch grains of a more or less spherical form. The woody cylinder exhibits numerous vessels, generally isolated, but rarely in groups of two or three, and scarcely varying in size. The centre of the root is occupied by a group of the vessels. The medullary rays consist of a single series of cells. The thickness of the bark generally equals that of the wood. There are no raphides present in the root, although macles or cluster crystals are present in the stem, both in the cortical parenchyma and in the pith, diminishing in numbers as it approaches the root. The leaves when present have a plano-convex midrib and are seen to be furnished with unicellular hairs, with a swollen base immersed in the epidermis and filled with a yellowish resinous matter. The stem has two or three rows of fibres surrounding the central cylinder in a nearly continuous ring, which, however, ultimately splits up into isolated groups. The absence of raphides distinguishes it from *psychotria*, *richardsonia* and *ipecacuanha*;

the vessels also from the last, and the color of the roots from the first two.—Pharm. Journ., April 2, 1898, 324; from Journ. de Pharm. de Anvers.

Ipecacuanha—Medicinal Use of the De-Emetinized Drug.—Dr. Owen F. Paget, of Honolulu, advocates the use of de-emetinized ipecacuanha, presumably the drug freed from all alkaloids, as a specific for acute and chronic dysentery. He mentions the case of a patient who, after having suffered for over a year from bloody discharges, was completely cured in twenty-four hours by 10-grain doses of the drug given every four hours.—Pharm. Journ., April 23, 1898, 385; from Brit. Med. Journ., April 16, 1898.

Coffee—Presence of a New Alkaloid.—From an aqueous decoction of coffee which had been extracted with chloroform to remove caffeine, Forster and Riechelmann obtained by precipitation with phospho-molybdic acid an alkaloid which is distinguished from caffeine by its insolubility in chloroform, by not giving the murexide reaction, and by giving a precipitate with picric acid. It was obtained from the phospho-molybdic precipitate by mixing this with water and milk of lime, drying this mixture by adding plaster of Paris so as to avoid evaporation, and extracting the dry residue with pure alcohol. The filtrate on evaporation yielded a brown oil, which crystallized with difficulty.—Pharm. Zeitg., xlii., 309.

Wangchi—A Chinese Dye-Material.—The "Chemist and Druggist" calls attention to "wargchi," the name given in Shanghai to the fruits of *Gardenia florida*, a shrubby plant indigenous to China, Japan and the Borrin Islands. These fruits are about 1½ to 2 inches long, ½ inch in diameter and of an orange-brown color. The calyx is prolonged down the fruit in the form of prominent ribs. The numerous seeds are embedded in an orange-colored pulp. These fruits are employed by the Chinese extensively as a yellow dye for silks, and for other coloring purposes; while in Japan, where the fruit is called *Kuchi-nashi*, they are used medicinally on account of their emetic, stimulant and diruretic properties. —Chem. and Drugg., 1898, 368.

Mitchella Repens—Test for Hydrocyanic Acid.—Some inquiries having been made by Dr. Greshoff, of the Koloniaal Museum, Harlem, Holland, concerning the alleged presence of hydrocyanic acid as a constituent of *mitchella repens*, L., commonly known as partridge-berry or squaw-vine, the inquiry was referred to Dr. Kremers, of the University of Wisconsin School of Pharmacy, at whose request Richard Fisher has now completed some experiments undertaken with the view to settle the point in question. Two samples of the whole herb were obtained for analysis, one collected in St. Genevieve Co., Mo., the other in the state of New York—both during the month of October, the latter sample including some of the red, fleshy berries of the plant. The author describes the method of conducting his experiments, which were repeated in all cases that admitted of doubt, but in no case was any hydrocyanic acid found. The tests were also applied to the bruised berries with negative results. The conclusion, therefore, is evident that *mitchella repens*, at least when collected in fall, does not contain any hydrocyanic-producing glucoside.—Pharm. Review, March, 1898, 98–100.

RHIZOPHOREÆ.

Ceriops Candolleana—Percentage and Character of the Tannin in the Bark.—Henry Trimble has had opportunity to examine two samples of bark of one of the mangrove species—*ceriops candolleana*—which has the reputation of containing large quantities of tannin and coloring matter. One of the samples was received from Bengal, the other from Singapore, and they yielded the following percentage of moisture, ash and tannin:

			Tannin in	
	Moisture.	Ash in absol. dry sample.	original sample.	absol. dry sample.
Sample from Bengal...	13.70	5.83	27.24	31.56
Sample form Singapore.	13.34	10.60	20.00	23.07

The very high tannin percentage in these barks bears out the reputation of ceriops bark, and is higher than is usually found in barks, being perhaps only equaled by the wattle barks of Australia. Elementary analysis of the tannin and its reactions towards iron salts, bromine water and calcium hydrate, prove it to belong to the class of oak bark tannins. One of the practical drawbacks to the use of ceriops bark, however, is its tendency to produce a red colored and soft leather.—Amer. Jour. Pharm., Oct., 1897, 505–506.

UMBELLIFERÆ.

Caraway Fruits—Origin and Development of the Vittæ.—Acting upon the suggestion of Professor Greenish that it would be interesting to investigate the origin and development of the vittæ of one of the official umbelliferous fruits, Harold E. Mathews has made a histological examination of the flower and fruit of *carum carui*, the results of which he communicates in detail, accompanied by illustrations showing the development of the vittæ and of the fruits, and he summarizes his conclusions as follows: The vittæ of caraway fruit arise schizogenously deep in the tissue of the ovary wall, and are lined by an epithelium. The nuclei of the epithelial cells disappear, and the cells become filled with a dark brown substance, which forms with the cell walls one thick homogeneous wall to the vittæ. The band of tissue lying outside the vittæ, and constituting the bulk of the ovary wall, then becomes almost entirely obliterated, so that the vittæ are finally situated on the outer surface of the pericarp, although they had their origin deep in its interior.—Pharm. Journ., Mar. 12, 1897, 259–260.

Cicuta Vagans, Greene—A Highly Poisonous Western Plant.—Professor

U. P. Hedrick reports frequent poisoning of stock, and not rarely of human beings, by the thickened root of a western species of *cicuta*—*c. vagans*, Greene. It very closely resembles the "wild parsnip," *c. maculata*, L., of the more eastern localities, but seems to be confined to the West, occurring in Oregon, northern California, Washington and British Columbia. Of its deadly nature there is no doubt, a piece of the size of a walnut being, by experiment, sufficient to kill a cow. Death occurs usually in a few hours. It is of interest to note, however, that the root seems to possess poisonous properties only when dormant, during the winter months, and in the early spring for a short time after growth has begun.—Pharm. Review, October, 1897, 206; from Bull. 46, Oregon Exper. Station, 1897.

Conium Maculatum—Standard Pharmaceutical Preparations and their Activity.—With the view to determining the question whether the action of a standard solution of coniine, or of the mixed alkaloids of conium, was similar to that of a standardized galenical preparation of conium of the same alkaloidal value, E. H. Farr and R. Wright have prepared the following preparations and solutions and forwarded them to Dr. Wm. Findlay, who, under the direction of Professor Cash, conducted the experiments necessary to determine their relative physiological action:

I. *Fluid Extract of the Dried and Unripe Fruits*, prepared with 80 per cent. alcohol by a process of repercolation, as follows: The coarsely-powdered drug was divided into four equal portions, each portion being percolated successively with the percolates from the preceding portion until from the fourth portion of four ounces three fractions of percolate, each of four fluid ounces, were obtained. These fractions, when assayed, gave the following percentage of alkaloidal hydrochlorides, 3.37, 0.93 and 0.10, while the expressed liquid obtained from the marc assayed 0.07 per cent. A standardized fluid extract was then made for the purpose of the experiment by diluting the first fraction, containing 3.37 per cent., with sufficient of the second portion, containing 0.93 per cent., to reduce the alkaloidal strength to 2.5 per cent.

II. *Solution of Mixed Alkaloids.*—This was prepared by extracting the fruits by percolation with 70 per cent. alcohol, acidifying the percolate, distilling off the alcohol, separating the alkaloids by a process previously employed by them ("Pharm. Jour." (3) xxi. 859), and after purification making a solution with a slight excess of hydrochloric acid containing exactly 2.5 per cent. of alkaloidal hydrochlorides.

III. *Succus Conii Fruct.*—This was made from the fresh unripe fruit, and yielded an assay of 0.70 per cent. of total alkaloidal hydrochlorides.

IV., V. and VI. were solutions of coniine hydrochloride, conhydrine hydrochloride, and pseudo-conhydrine hydrochloride, containing each 2.5 per cent. of the respective alkaloidal hydrochloride.

The results of the physiological experiments by Dr. Findlay on guinea-pigs and rabbits show the same general action as belonging to coniine, the mixed alkaloids and the fluid extract. Conhydrine and pseudo-conhydrine acted in an analogous manner, but comparatively large doses are required. Thus a lethal effect in guinea pigs was produced by 0.937 Gm. of coniine and 0.039 Gm. of mixed alkaloids per kilo, while for the same weight of animal 0.257 Gm. of conhydrine, and not less that that quantity of pseudo-conhydrine was required.

Concerning the *fluid extract* Dr. Findlay observes that the results have not been exact enough to allow of tabulation with the alkaloids, but it is evident that its activity on frogs is as great as that of coniine. The *succus* proved rather inconvenient in attempts to compare it with much stronger preparations, and the experiments with it were consequently uncertain.—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1897, 356–360.

Asafetida—Correct Orthography of Both the English and Latin Word.—Prof. John Attfield, having during the past fifteen years been called upon twice to decide as to the correct orthography of the word "asafetida," has again been called upon to decide upon the correct spelling of the word, both in Latin and in English. While in the Pharmacopœia of the United States of America the English word is spelt "asafetida," the diphthong "œ" is retained in the Latin word, which, both in the 1880 and 1890 editions, remains "asafœtida." Having satisfied himself that the vowel "e" might properly be substituted for the diphthong "œ" in the Latin word, he has consulted some of the highest authorities in philology (Prof. Max Müller and Dr. Murray), who agree with him that the Latin as well as the English word should be spelt "asafetida." The use of the diphthong "œ" in the word is regarded by these authorities as a mediæval or renascence mistake, probably after some false analogy, the Latin MSS. of the middle ages, and down to very lately, showing that much confusion prevailed as to the diphthongs "æ," "œ," and the vowels "ē ē" in many Latin words. In the "Oxford New English Dictionary," edited by Dr. Murray, the word "fetid" is explained as being derived from the Latin word "fetidus" (often incorrectly written "fœtidus"); yet the word under discussion is not spelt "asafetida," but the time-honored spelling "asafœtida" is here retained, an error which will doubtless be corrected in future editions of the dictionary. Prof. Attfield concludes that there can be little doubt that both in Latin and in English the word in question will be spelt "asafetida." In exact quotations from the older authors, their spelling of the word would probably be retained; but in such cases the context would prevent confusion.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1897, 351–354.

Levisticum Officinale—Yield and Character of Volatile Oil of the Root.—According to the experiments of Braun the root of *levisticum officinale* contains from 0.6 to 1 per cent. of volatile oil. The oil obtained from the dried root has a sp. gr. 1.0407 and boils at 170°, while the oil from the fresh root has a sp. gr. 1.0287 and boils at 185° to 190°. In contradiction to the observation of Flückiger that the oil is dextro-rotatory, the author finds that it is optically inactive. It is faintly acid in reaction, and yielded the following components: 1. A body of the composition $C_{10}H_{18}O$, resembling *cineol*, but differing in not yielding solid compounds with the halogens. 2. A terpene of the composition $C_{10}H_{16}$, corresponding to *limonene* in its properties. 3. *Iso-valerianic acid*, $C_5H_{10}O_2$. 4. *Acetic acid*, a product of oxidation. 5. *Benzoic acid*. Although the oil when heated with platinum chloride gives off a distinct odor of *angelic acid*, which would indicate the presence of *angelic acid aldehyde*, the author was unable to establish the identity of the latter in the course of his investigation.—Pharm. Centralh. July 1, 1897, 419–420.

ARALIACEÆ.

Garrya Racemosa, Ramirez—Alkaloidal Constituent.—According to Armendariz the bitter bark of the Mexican *garrya racemosa*, contains a crystallizable alkaloid, which he names

Garrine.—It is odorless, very bitter, easily soluble in water and in alcohol, and apparently the active constituent of the drug. The drug acts as a digestive and bitter tonic, but it also acts very energetically upon the respiratory centers, the subcutaneous injection of a decoction being capable of producing death by paralyzing them.—Apoth. Ztg., 1898, 178.

Ginseng—Cultivation.—Bulletin No. 16 of the United States Department of Agriculture details the commercial history and cultivation of ginseng. Already considerable tracts are under cultivation in this country, and it is evident that whatever future there is in the industry of supplying the demand for ginseng in China must come from the cultivated article, a fact which is accentuated by two Consular Reports for April—the one entitled "American Ginseng in China," the other "Ginseng in Korea." In these it is shown that the American product—as now supplied—cannot replace the cultivated product from Korea, which brings the tenfold price of the American. Both consuls call attention to the fact that the use of ginseng among the Chinese is almost entirely one of sentiment; yet every man, woman and child in China uses it not only as a cure for all kinds of diseases, but also as a preventative against dreaded ailments.—Amer. Jour. Pharm., May, 1898, 251.

RANUNCULACEÆ.

Ranunculaceæ—Botanical and Macroscopical Description of Typical Members of the Different Genera.—Frederick LeRoy Sargent, beginning with the August 15, 1897, number of "Merck's Report," contributes a series of papers on the buttercup family of plants, in which, with profuse illustrations, he describes the botanical and macroscopical distinctions and the more significant peculiarities of typical representatives of the numerous genera. These papers will be consulted with advantage, since the family of the Ranunculaceæ comprises nearly a thousand species in twenty-eight genera, many of which are among the most common wild or cultivated flowers, both in the Old and the New World. Familiar examples are *clematis*, *anemone*, *thalictrum*, *ranunculus*, *caltha*, *helleborus*, *coptis*, *nigella*, *aquilegia*, *delphinium*, *aconitum*, *actæa*, *pæonia* and *hydrastis*.

Helleborus niger—Investigation of Glycosidal Constituents.—K. Thaeter commuuicates the results of his investigation of the glucosides—*helleborein* and *helleborin*—which were originally determined by Husemann and Marmé as constituents of both *helleborus niger* and *helleborus viridis*. Following the methods of these investigators for their isolation from the roots of *helleborus niger*, the author found it necessary to devise a substantially new method for the preparation of helleborin, while the method for helleborein yielded, with some slight modification, very satisfactory results. He succeeded by these modifications in obtaining

Helleborein in the form of a conglomeration of fine needles, which were easily reduced to a yellowish white powder. This, however, did not exhibit the pronounced hygroscopic characters of the helleborein described by Husemann and Marmé, and he believes the difference in this respect to be due to the greater purity of his product. In all other respects, the physical characters of the two products were found to be identical, but there is a wide deviation in so far as the chemical composition and the products of the decomposition of the two helleboreins by acids. Husemann and Marmé had found that by the hydrolysis of helleborein with dilute acids, it was simply split up into a blue body—helleboretin—amounting to 40 per cent., and into sugar, amounting to 59.85 per cent. By elementary analysis they determined the formula of helleborein to be $C_{26}H_{44}O_{15}$, and of helleboretin to be $C_{14}H_{20}O_3$, the hydrolysis consequently taking place according to the following equation: $C_{26}H_{44}O_{15} = C_{14}H_{20}O_3 + 2C_6H_{12}O_6$. Thaeter's results, however, have determined that the splitting up is not so simple, and that, under assimilation of water, acetic acid is formed along with sugar, the latter being dextrose. Moreover, his analytical results lead to the formula $C_{37}H_{56}O_{18}$ for helleborein and $C_{19}H_{30}O_5$ for helleboretin. By hydrolysis 41.95 per cent. of helleboretin and 44.25 per cent. of dextrose were obtained, the reaction taking place, under the assimitation of 5 mol. of water, according to the following equation: $C_{37}H_{56}O_{18} + 5H_2O = C_{19}H_{30}O_5 + 2\ C_6H_{12}O_6 + 3C_2H_4O_2$. Experiments were also made which determine that the acetic acid is not, as might be supposed, a secondary product produced by the action of the dilute acid upon helleboretin. Judging from the products of its reactions with melting alkali, and with oxidizing agents, the author is inclined to the assumption that helleborein belongs to the fatty series of bodies. The author also finds that concentrated nitric acid gives a characteristic reaction with helleboretin, which is serviceable for the qualitative determination of helleborein. If the latter is evaporated with a little diluted nitric acid, it is converted into the blue helleboretin. On dissolving, the residue of evaporation in concentrated nitric acid, a violet colored liquid is produced which possesses considerable intensity and permanence, so that the violet color is retained for a long time in its dilution by water until, finally, the violet body is precipitated in flocculent condition. The second glucoside,

Helleborin, was obtained by the following simple process: From an ethereal extract of the root, composed largely of fats, resins and coloring matters, with small quantities of crystals of helleborin, the fats were removed by petroleum ether, while acetone extracted the resins and coloring matter. The crystals of helleborin were collected on a filter, washed with acetone, and so obtained nearly white. By recrystallization from ether it was finally obtained perfectly white and identical in its physical characters with the helleborin of Husemann and Marmé. It deviated from the description of these chemists only in the results of the elementary analysis, which establishes the formula $C_6H_{10}O$ instead of $C_{36}H_{42}O_6$. The author also confirms the glucosidal character of helleborin, but finds its hydrolysis to be far more difficult than that of helleborein. In accordance with his analytical data, also, the formula for the product of hydrolysis, *helleboresin*, which is given H. & M. as $C_{30}H_{38}O_4$, must also be revised; but to this end further experiments are necessary.—Arch. de Pharm., No. 6 (Aug. 17), 1897, 414–424.

Delphinium Zalil—Investigation of Coloring Matters.—A. G. Perkin and J. A. Pilgrim find that three glucosidal coloring matters exist in *delphinium zalil*, which is much used in India for the production of a yellow color on alum-mordanted fabrics. The more sparingly soluble coloring matter, $C_{16}H_{12}O_7$, is evidently identical with

Isorhamnetin, a quercetin monomethyl ether, recently isolated from the yellow wallflower, *cheiranthus cheira*. It forms glistening yellow needles, soluble in alkalies, with a yellow color. Fused with alkali, it yielded phloroglucinol and protocatechuic acid, and by means of hydriodic acid it yielded quercetin with the evolution of 1 mol. of methyl ether. By oxidation in alkaline solution it yields vanillic acid, and with alumina as mordant, it dyes a purer yellow than

Quercetin, which is the chief constituent of the more soluble portion of the dye-stuff under examination. The third coloring matter, present only in small quantity, was not obtained in a pure condition. It resembled quercetin in the percentage composition, and in its decomposition products, but differed from it in not reacting with alcoholic potassium acetate, and in the melting point of its acetyl derivative.

"Asbarg," as the dried flowers and flowering stems of *d. zalil*, composing this dye-stuff, are called, resembles quercitron bark in dyeing property, but has only 35 per cent. the tinctorial power of that dye-stuff.—Pharm. Jour., April 2, 1898, 323; from Proc. Chem. Soc., *190*, 55.

MAGNOLIACEÆ.

Star Aniseed—Indiscriminate Importation into China of the Poisonous Japanese Fruits.—Augustin Henry observes that the tree producing the aniseed of commerce, *illicium verum*, Hook. f., is known only to occur in the Chinese provinces of Kwangsi and Tongking; while it is equally well established that the Japanese species of *illicium religiosum* (*I. anisatum*, Linné) produces a poisonous fruit, which is distinguished by the Japanese name

"*Skimmi.*" It is astonishing, therefore, to find that year after year enormous quantities of "skimmi" are sent out of Japan to China, and that a distinction is made between the true article and its poisonous adulterant only in the statistics of a single Chinese port, that of Shanghai. In any other country than China, steps would have been taken before now to check an importation which is not only deleterious to health, but also one which must interfere with profits derived by Chinese producers of the genuine article. The only Chinese port, practically, from which star-anise is exported is Takhoi. From Tongking there does not seem to be any export of the fruit; but owing to benefits arising from certain fiscal arrangements, the oil is now being sent in quantity from Haifong to France—the oil, according to a report of Mr. Morse, from Lungchow, being produced in three districts: Langson in Tongking, and Lungchow and Posê in Kwangsi. Mr. Morse also points out that the native mode of gathering the fruit so damages the trees that a good crop is only possible in one year out of three.—Pharm. Jour., Jan. 15, 1898, 47–48.

MENISPERMACEÆ.

Jateorhiza Calumba—Historical, Botanical and Pharmacognostic Description.—Prof. John Uri Lloyd gives the history of calumba root in chronological sequence from the year 1671, when Franciscus Redi first described it under the now generally accepted *calumba*—not *columbo*. He gives a botanical description of the plant yielding it, accompanied by beautiful drawings showing a flowering branch in natural size, together with the principal organs of the plant, and a transverse section of the root. A description of the drug and its constituents, of its substitutions and related species, is also given, followed by notes concerning the physiological action of the drug and its pharmacopœial uses. A bibliography, embracing twenty-eight references, is appended.—West. Drugg., Jan., 1898, 8–11.

RUTACEÆ.

Buchu—Constituents of the Essential Oil.—According to Kondakoff and Bialobrzeski, the volatile oil of buchu contains, besides the solid diosphenol, two other bodies. The one, a hydro-aromatic ketone closely resembling menthone, boils at 207°–209° under 757 Mm. pressure, has a sp. gr. at 18.5° C. of 0.8994, forms an oxime, and combines with 3 mols. of bromine, the resulting compound decomposing spontaneously. The second liquid constituent is a hydro-aromatic hydrocarbon, boiling at 174°–176°, having a sp. gr. of 0.8684 at 18.5° C., and an odor resembling that of peppermint.—Pharm. Jour., July 31, 1897, 84; from J. Pr. Chem., through Jour. Chem. Soc., lxxii., i., 227.

Guaiac Resin—Commercial Quality and Pharmacopœial Definition of Impurities.—J. Evans, in view of the unsatisfactory statements concerning the impurities that may be present in guaiac resin, has subjected six samples to examination in order to determine the amount of residue after complete exhaustion by successive macerations in alcohol, and the percentage of ash yielded by such residue. The results are shown in the following table:

Sample.	Description.	Percentage of Matter Insoluble in Spirit.	Percentage of Ash Yielded by the Residue.
A..................	Good block resin	2.99	56.2
B..................	" " "	7.66	18.0
C..................	" " "	7.89	23.1
D..................	" " "	10.00	18.7
E..................	Fine tear	1.54	11.5
F.............. ...	Seconds	9.00	20.2

From these results it will be seen that the four samples of good block guaiac resin contain from 2.9 to 10 per cent. of impurity insoluble in spirit, and the amount of ash left by the residues on incineration varies greatly, the residue of sample A yielding as much as 56.2 per cent. of ash. Sample E, which was described as fine tear, contains much less impurity insoluble in spirit, viz., 1.54 per cent. Sample F, which was described as seconds, contains 9 per cent. of insoluble matter, 20 per cent. of which is inorganic. Finding that the amount of impurity, in the form of fragments of wood, bark, etc., varies so much in different samples of guaiac resin, a note should be made in the Pharmacopœia of the limit to such impurities. Judging from the results obtained, the amount of impurity insoluble in alcohol should not exceed 7.5 per cent., but there is no reason why it should not be as low as 5 per cent. From the table it will be observed that the fine tear sample contains the least amount of impurity, and so should be used in making the preparations official in the B. P.—Pharm. Journ., May 28, 1898, 508.

Pilocarpus pinnatifolius—Cultivation in Italy.—Gaylio states *pilocarpus pinnatifolius* grows well in the open in Sicily, and that its cultivation might prove a paying industry. He had obtained from leaves grown in the Botanical Gardens of Palermo 0.062 per cent. of pilocarpine, while commercial jaborandi leaves only yielded 0.056 per cent., though the latter figure is lower than that of Merck, who found 0.07 per cent. in commercial leaves. —Pharm. Ztg., 1898, 130; from Arch. de Pharmacol.

Jaborandi—Commercial Varieties and their Source.—Herman Geiger has very thoroughly studied the character of the commercial varieties of jaborandi leaves, his investigation covering their commercial and botanical source, and their macroscopic, microscopic, and botanical characteristics. While, with a single exception, he has been able to confirm the observation of Holmes that the jaborandi leaves of commerce are yielded by five species of *pilocarpus*, his very exhaustive inquiries point out that, contrary to the views of Holmes, the commercial designations derived from the locality or port whence they are exported—such as Pernambuco, Paraguay, Ceara, Markham and Aracati jaborandi—do not apply to single species, but that the original bales of the drug, from any of these sources, are at the present time always composed of the leaves of two or three species or sorts of jaborandi. This is explained by the fact that the drug is not always the produce of the country adjacent to the respective ports of export, but is the accumulation from different regions for commercial exportation. Thus the author found the bales of a large consignment of jaborandi, which was received in Hamburg in one vessel from Ceara, to be composed mainly of mixtures of the leaves of *pilocarpus jaborandi*, *p. spicatus*, *p. microphyllus* and *p. trachylophus*.

The author has furthermore determined that the jaborandi of commerce is yielded by six different plants, five of them being different species of *pilocarpus*, viz., (1), *pilocarpus jaborandi*, designated by Holmes as the "genuine jaborandi," originally sent to Europe by Dr. Continko, and yielding the largest percentage of alkaloid; (2) *pilocarpus pennatifolius*, Lem.; (3) *pilocarpus trachylophus*, Holmes; (4) *pilocarpus microphyllus*, Stapf.; (5) *pilocarpus spicatus*, St. Hil.; and (6) a new substitution of *pilocarpus microphyllus*, which Holmes has designated as being the leaf of *swartzia decipiens*. While the microscopic distinctions of these several leaves are not always satisfactory, the following distinctions are easily made with the naked eye:

1. *Pilocarpus pinnatifolius*, Lem., is distinguished from *p. jaborandi*, Holmes, by the pale gray color of the leaf, the acuminately based leaflets, and the faint prominence of the central-nerve of the leaflets. The leaves of *p. jaborandi*, Holmes, are, on the contrary, characterized by a dark-, often brown-green color, an unequally halved, blunt-based leaflet, and distinctly prominent central-nerve upon the upper surface.

2. *Pilocarpus microphyllus*, Stapf, is characterized by the winged petioles and the smallness of the leaflets.

3. *Pilocarpus spicatus*, St. Hil., is characterized by being the only species having *single* leaves, and having an irregular anastomosis of the nerves; whereas, the venation of all the other species is regularly convoluted towards the margin, and exhibits a distinct marginal venation. The

author also finds that the pinnatification of the leaflets of the different leaves is as follows: *P. jaborandi*, at most 4-yoked; *p. pennatifolius* and *p. trachylophus*, at most 3-yoked; and *p. microphyllus* and *swartzia decipiens*, at most 5-yoked. Examined under the microscope, the leaves of some of these species afford very distinct characteristics, but here, also, do not serve for the certain characterization of all the commercial varieties of jaborandi. A systematic botanical study of the different leaves, while not conclusive, has also added considerable to the knowledge of the different plants yielding them. Thus it is very evident that the *pilocarpus jaborandi* of Holmes is, as claimed by that author, a distinct species, and not, as claimed by Baillou, identical with *p. pennatifolius*, Lem. The latter, on the other hand, is identical with the *pilocarpus selloanus* of Engler; while *p. trachylophus*, Holmes, *p. microphyllus*, Stapf, and *p. spicatus*, St. Hil., are evidently distinct species. The latter species also appears to yield the so-called "Aracati-Jaborandi," and the author regards the species to be identical with the *p. subcoriaceus* and *p. ypanemensis*, described by Engler as distinct species in 1896. As regards the *swartzia decipiens* of Holmes, the author finds it to be distinct from *s. alterna*, *s. mathewsi*, and *s. pilulifera*, and if a *swartzia* at all, it must be regarded as a new species. But, on this point, further investigation must be made upon perfect flowering material. The author's present paper is to be followed by one in which his investigations are given in greater detail and accompanied by illustrations.—Arch. d. Pharm., No. 7 (Oct. 15), 1897, 503-518.

Jaborandi—Active Preparations.—Brissemoret has made a study of the physical and chemical behavior of the several alkaloids of jaborandi, with a view of determining the best methods for making galenical preparations. He concluded that maceration is the best process for extracting the virtues of jaborandi leaves, but that under no circumstances should resort be had to infusion, for on prolonged heating the active principle, pilocarpine, is split up into pilocarpidine and jaborine, two bodies with entirely different physiological action from that of pilocarpine.—Amer. Drugg., Jan. 10, 1898, 6; from Rép. de Pharm., 1897, 507.

Larrea Mexicana—Proximate Constituents, etc.—Clement B. Lowe briefly reviews the habitat and principal botanical characteristics of larrea mexicana. This interesting plant, called by the Mexicans gobernadora and hideondo, and in California popularly creosote bush and greasewood, is found abundantly in the dry valleys of Kern county, and in the Death Valley of Inyo county, California, and eastward from Walker's Pass and Talhichipi to western Texas, and southward into Mexico; also along the lower Muddy River in Nevada and the Santa Clara Valley of Utah. It is said that no animal of the country will eat the plant. He has received a supply of the plant from Mr. W. H. Avery, of Los Angeles, California, who states that the people living in the desert ascribe wonderful properties to it for curing external ailments, as galls and bruises on horses and mules;

while the footsoreness of pedestrians walking on hot sand is said to be quickly cured by soaking the soles of their feet in a decoction of the herb. Any efficiency that it may possess in this direction is probably due to a strongly odorous resin that closely resembles ordinary shellac. This covers the leaves and small twigs of the plant, and is most abundant during the hot and dry season of the year, its function being evidently to lessen transpiration, and to adapt the plant to the dry localities in which it grows. While, therefore, the leaves in winter time seem thoroughly varnished, the spring growth examined in June shows very little coating. At the author's request, a proximate examination of the drug has been made by Wm. E. Krewson, with the following results:

Moisture, 7 per cent.; ash, 7.45 per cent.: extracted by petroleum ether, 1.87 per cent. (soluble in water, 28.18 per cent.; caoutchouc, 0.43 per cent.; fixed oil and fat, 0.93 per cent.); extracted by stronger ether, 17.27 per cent. (resins and vegetable acids); extracted by alcohol, 7.30 per cent. (resins, chlorophyll and vegetable acids); extracted by water, 11.71 per cent. (mucilage, 1.92 per cent.; dextrin, 4.33 per cent.; glucose, 0.31 per cent,; sucrose, 0.12 per cent.); extracted by alkaline water, 6.24 per cent. (albuminous and mucilaginous matter, 0.13 per cent.; extracted by acidulated water, 3.17 per cent. (pararabin, 1.59 per cent.); starch, 3.21 per cent.

Possessing strong antiseptic and stimulant properties, an excellent ointment might probably be prepared by incorporating a definite amount of the resin with lard, or by digesting the leaves of the plant with lard. Internally it may possibly prove of value as a stimulating expectorant analagous to *Eriodictyon.*—Amer. Jour. Pharm., May, 1898, 237.

GERANIACEÆ.

Monsonia Ovata—A Remedy in Chronic Dysentery.—Maberly has used the alcoholic tincture of *monsonia ovata*, and of another species, with good results in the treatment of dysentery in South Africa. The tincture —strength not stated—is given in doses of 8 to 15 Gm. every 4 to 6 hours, and cures were gradually effected in 2 to 3 days, though in chronic cases from 8 to 10 days were required. The action of the drug appears to be that of a bactericide and anodyne.—Pharm. Centralh., July 8, 1897, 443.

MALVACEÆ.

Althæa Officinalis.—Occurrence of *betaine* and *asparagine* in the root. See *Betaine* under "Organic Chemistry."

Althæa Rosea—Reaction of the Pigment in the Flowers with Alkaloids. —The observation of Benezech (1892) that the flowers of the hollyhock contain a pigment which, in infusion, gives a characteristic green color with codeine, has induced J. F. Woolsey to make some experiments with the view to the verification of this statement and the determination of its possible value as a reagent. Having convinced himself that codeine produces a green color in an infusion of *althæa rosea* (1 flowers to 10 water), he tried the effects of atropine upon the infusion, with the same result, and upon further experiment he found that a number of other alkaloids produced a more or less grass-green color with the pigment contained in the infusion—as follows: Atropine, homatropine, berberine sulphate (olive green), codeine, coniine, hydrastine, hydrastinine, nicotine, and lobeline. Negative results were obtained with the following alkaloids: Morphine, apomorphine hydrochloride, caffeine, carpaine, cocaine hydrochloride, cinchonine, cinchonine sulphate, cinchonidine, colchicine, emetine, hyoscine hydrobromide, hyoscyamine hydrobromide, narcotine, piperine, physostigmine salicylate, quinine, quinine sulphate (a purplish color), sparteine sulphate, sanguinarine and strychnine. These results prove that, while the test is not characteristic for codeine, it may serve for its distinction from morphine.—Bull. Pharm., Aug. 1897, 342.

Okra—A Neglected Source of Mucilage.—The "National Druggist" (Aug., 1897, 234), observes that the okra, *hibiscus esculentus*, which grows luxuriantly throughout the South, is very rich in mucilage, all parts of the plant abounding in this principle, and that it therefore seems strange that it has not found a wider use. Except in the domestic practice of the negroes and creoles of the Gulf states, it seems to have found no place. When deprived of its cortex, the root furnishes a powder as white as snow, extraordinarily rich in mucilage, tasteless, and far superior in every respect to marshmallow. The plant itself, root and stalk, was used during the Civil War as soothing poultices for inflamed wounds.

Dr. B. F. G. Egeling, of Chihuahua, Mexico, referring to an abstract of the preceding paper in the "Pharmaceutical Review" (Nov. 1897, 228), states that on account of the abundance of mucilage contained in it, the plant has become official in the last (3d) edition of the Mexican Pharmacopœia. Okra is very commonly used as a diuretic in Mexico, and it is stated that the fruits form the most important part of the popular French patent medicines, "Paté pectoral de Nafé d'Arabie" and "Sirop de Nafé d'Arabie," on account of their mucilaginous, pectoral properties. Another species of *hibiscus*, *h. sabdariffa*, L. enjoys medicinal reputation. The flowers, as infusion, form a very mucilaginous demulcent, and, on account of their containing considerable tartaric acid, this forms when sweetened with sugar an extremely pleasant drink. This drug is commonly kept for sale in Mexican drug stores. The coloring matter of the flower is said to resemble litmus.—Pharm. Review, Jan. 1898, 24.

STERCULIACEÆ.

Kola acuminata.—Occurrence in *Soluble Starch* in the epidermal cells of the leaves. See *Carbohydrates*, under "Organic Chemistry."

Kola Nuts—Determination of Alkaloids.—Karl Dieterich, in an exhaustive review of the investigations upon the constituents of kola nuts, states that the results of his own investigation agree with those of Knox and Prescott, who have determined that kolanin is not a single body—a glucoside—as has been claimed by other investigators, but it is a double-compound of caffeine and theobromine with tannic acid. The quantity of this compound present in the nuts is also very variable, since under certain influences it is decomposed, and free caffeine and theobromine take its place. In a former paper the author had shown that dried kola nuts, and particularly roasted nuts, contain more free caffeine and less of the double compound kolanin than the fresh nuts. And, since this natural double compound must be regarded as being medicinally more effective than the free caffeine, accurate processes for the determination of the total alkaloid and for free and combined alkaloid are very desirable. The author reviews the various processes that have been proposed—Knox and Prescott's, Delacour's, Schmidt's, Fromme's, Dohme and Engelhardt's, etc.—and gives a brief description of the large number of experiments made, and the conclusions drawn, while the results with ten different processes tried are shown in an instructive table. On the basis of these results and observations he now proposes the following methods for the assay of kola nuts:

Determination of Total Alkaloids: 10 Gm. of finely rasped kola nut are moistened uniformly with water, 10 Gm. of unslaked lime added, and the mixture placed in a patrone. This is exhausted in a Soxhlet apparatus for three-quarters of an hour with chloroform, until the chloroform runs off clear, then rinsed with chloroform, and the solution evaporated not quite, but almost, to dryness. This residue is taken up with 20 Cc. of normal hydrochloric acid, slightly warming, and the solution filtered, washing the filter and evaporating dish carefully and pouring the solution into a separatory funnel holding 100 Cc. The contents of the funnel are then made strongly alkaline with ammonia, allowed to stand for fifteen minutes, with frequent shakings, and then shaken out three times with 20 Cc. of chloroform each time. The chloroformic solution is then evaporated, preferably in an Erlenmeyer flask, or in a crystallization dish, the latter placed in a capsule with hot water, not directly upon the steam-bath (in order to avoid the "creeping over" of the crystals), and the white caffeine dried to a constant weight. This weight when multiplied by 10 gives the percentage of total alkaloid present.

Determination of Free and Combined Alkaloids: 10 Gm. of the finely rasped kola nut is mixed without previous moistening with 10 Gm. of coarse, clean sand, and extracted in a Soxhlet apparatus for two hours with chloroform. The chloroformic solution is evaporated to a constant weight, and the combined weight of the fat and of the free caffeine noted. The mixture is then boiled with water, the solution filtered and the filter carefully washed. The aqueous solution is evaporated, the crude caffeine taken up with 20 Cc. of normal hydrochloric acid to purify it, as directed above for the total alkaloids. The acid solution is filtered, saponified by the addition of ammonia, and shaken out with chloroform three times at intervals of fifteen minutes. The chloroformic solution is then evaporated to constant weight, which, multiplied by ten, gives the percentage of free caffeine present. By subtracting the quantity of free caffeine from the combined weights of the caffeine and fat, determined as above, the quantity of fat present may be ascertained. By subtracting the quantity of free caffeine from the quantity of total alkaloids, as determined in the process first given, the amount of combined caffeine is ascertained. Finally, the author gives the following simple method for the

Identification of Kola Nut in Powder, to be used in connection with a microscopical examination.—Twenty grammes of the powder are mixed with 10 Gm. of burned magnesia, moistened with diluted alcohol and digested with 100 Gm. of diluted alcohol with the aid of a moderate heat, preferably by allowing to stand in a warm room for twelve hours. The mass is then pressed out, filtered, and the filtrate put into a clear glass beaker of at least 10 Cm. width. In a layer of this thickness the fluid shows a bluish green color, and a fluorescence resembling that of tincture of curcuma. This reaction is only given by raw (unroasted) kola powder. —Pharm. Ztg., Sept. 22, 1897, 647–649.

Kola Nuts—Effect of Roasting.—Dr. Karl Dieterich observes that, while in England and America the fresh kola nuts are frequently used, the roasted nut is generally used in Germany. This imparts to the nut a coffee-like taste, but this is at the expense of its active constituents as well as loss in weight to the extent of 25 per cent. Moreover, as the author has previously shown, the natural double salt of caffeine and theobromine with kola-tannic acid is more active than the free alkaloids, and this compound is decomposed, the alkaloids being set free and, in part also, volatilized. The loss which is occasioned by the process of roasting, as well as the effect upon the natural double salt, is shown in the following determination of the contents of fluid extracts prepared by the author from the same lot of kola nuts to show the difference between the results obtained from the ordinary dry nuts and from the same when roasted :

	Dried.	Roasted.
Total crude caffeine	1.932 per cent.	1.675 per cent.
Total pure caffeine	1.732 "	1.362 "
Free caffeine	1.110 "	0.952 "
Combined caffeine	0.662 "	0.410 "
Water	11.530 "	7.190 "
Ash	3.000 "	5.440 "
Fat	0.756 "	0.7687 "

The dried nuts show 64 per cent. of the total alkaloid as free and 36 per cent. as combined ; while in the roasted nut 70 per cent. of the total alkaloid is present in the free state, while only 30 per cent. is in the form of the natural double salt.

When properly prepared, the fluid extract of kola nuts should not contain less than 0.95 per cent. of total alkaloids.—Amer. Drugg., Oct. 25, 1897, 244; from Proc. Soc. Germ. Nat. & Phys., Sept. 1897.

False Kola Nuts—Mora Excelsa the Probable Source.—J. H. Hart, corresponding member of the British Pharmaceutical Society in Trinidad, has compared a specimen of the false kola nuts, received several years ago in London (see Proceedings 1897, 533), and compared it with the genuine seed of *Mora excelsa*, which had been identified as the probable source. He found that the peculiar form of the starch granules is the same in each. —Pharm. Jour., Feb., 1898, 184.

Cacao—Cultivation and Harvesting.—The "American Druggist" (Nov. 25, 1897, 311–312), contains an article in which the known facts concerning the conditions favorable to the growth of the cacao tree, its cultivation, harvesting of the seeds, their constituents, commerce and uses are interestingly described. Requiring an average temperature of 80° F., a moist soil and a humid atmosphere, the area suited for its successful cultivation is comparatively restricted. It is cultivated in Venezuela, Brazil, Ecuador, Guatemala, Hayti, Colombia, French and Dutch Guiana, the West Indies, and, to some extent, also in Africa, Java and Ceylon. A cocoa plantation is set in quite the same manner as an apple orchard, except that the young stalks may be transplanted from the nursery after two months' growth. No preparation of the soil is deemed necessary, and no manures are applied. The young trees are planted about fifteen feet apart, about two hundred to the acre. Between each cocoa tree is planted a "bucare" tree, which is a tree of rapid growth, and serves to shade the soil and to shield the young trees from the torrid sun. Small permanent trenches must be maintained from tree to tree throughout the entire length of the rows, so that at least once a week the stream descending from the mountains may be turned into the roots. At the age of five years, the plantation begins to bear fruit, and to yield two crops a year—in June and December. In gathering, the workman is careful to cut down only fully-ripened pods, which he adroitly accomplishes with a long pole, armed at its extremity with two prongs or a knife. The pods are left in a heap on the ground for about twenty-four hours after being cut; they are then cut open, and the seeds are taken out and carried in baskets to the place where they undergo the operation of sweating or curing. There the acid juice which accompanies the seeds is first drained off, after which they are placed in a sweating box, in which they are inclosed and allowed to ferment for some time, great care being taken to keep the temperature from rising too high. The fermenting process is in some cases effected by throwing the seeds into holes or trenches in the ground and covering them with earth or clay. The seeds in this process, which is called "claying," are occasionally stirred to keep the fermentation from proceeding too violently. The sweating is a process which requires the very greatest attention and experience, as on it, to a great extent, depends the flavor of the seeds and their fitness for preservation. The length of time required by the operation varies according to the state of the weather, but a period of about two days yields the best results. Thereafter the seeds are exposed to the sun for drying, and those of a fine quality should then assume a warm, reddish tint.

Cocoa—Method of Detecting Starch.—Posetto recommends the following reagent for the detection of added starch in cocoa preparations: Iodine, 5 parts; potassium iodide, 10 parts; water, 100 parts. To make the test, 2 Gm. of the cocoa are boiled for two minutes with 2 Cc. of water in a test tube, the liquid is cooled, 20 Cc. more of water are added, and then 0.5 Cc. of the reagent without shaking the mixture. In the presence of added starch a permanent blue coloration is produced, whereas in pure cocoa only a transient color, not lasting in any case over twelve minutes, is produced. It is claimed that the test is sufficiently delicate to reveal the presence of 1 per cent. of added chestnut meal.—Pharm. Centralh., 1898, 155; from Giorn. dé Farm.

Chocolate—Examination for Ground-Nut as Adulterant.—The following methods for the microscopic and chemical examination of chocolate for the presence of ground-nut is recommended by Bilteryst: The substance having been freed from fat and sugar, is macerated for twenty-four hours in a five per cent. solution of chloral hydrate, after which the characteristic elements of the ground-nut kernel may be easily recognized under the microscope.

For the chemical examination, 50 Gm. of the chocolate are extracted with tetrachloride of carbon, the tetrachloride is distilled off, and refraction of the residual fat is determined by the refractometer: the refraction of pure cacao butter being — 190, while that of arachis oil is + 30. The fat of a chocolate, adulterated with 50 per cent. of ground-nut, had a refraction of 70, while that of another, containing 5 per cent. of ground-nut, showed 18. Ground-nut marc, left after expression of the oil, can be detected by determination of the nitrogen. Chocolate contains 9 of proteins, cacao, 18; ground-nut, 20, and ground-nut cake, 45 to 47.—Pharm. Centralh., *48*, 508.

Chinese Bandoline Wood—Botanical Source.—In 1880, Dr. E. Bretschneider mentioned that the shavings of wood which are soaked in water and used by Chinese ladies for "bandolining" the hair, are probably derived from *Sterculia platanifolia*, and that they are exported from Canton to Peking under the name of "Meis kao pas hua," meaning "cosmetic glue shavings." In 1895, however, G. M. H. Playfair, consul at Ningpo, sent to Kew specimens of the leaf of a tree, called "tias chang," which he had collected in the mountains near Ningpo, with the information that the shavings of the wood were used for the purpose described by the women of that part of China. These, as well as flowering specimens since sent, have been identified as

Machilus Thunbergii, Sieb. et Zucc., and it is stated on the authority of Dr. A. Henry, that the Canton shavings are derived from the same tree. The species is a native of Hong Kong and Chekiang westward to Szechuan, in China; also of Formosa, Japan and the Corean Archipelago.—Amer. Jour. Pharm., Dec., 1897, 643; from Kew Bulletin, Oct., 1897.

TERNSTRŒMIACEÆ.

Tea—Successful Cultivation in America.—From a paper in the April (1898) number of "The Cosmopolitan," (584–586) by LaFayette and Parks, it becomes evident that tea-growing may be successfully engaged in in suitable localities in the United States. It appears that at present the only tea plantation in this country is that of Dr. Charles U. Shepard, at Summerville, South Carolina. Last season upward of eleven hundred pounds of the finest tea obtainable was produced, and this year's crop will amount to more than two thousand pounds. Both green and black teas have been produced from choice imported Chinese and Japanese seed, and the teas from this estate, in the opinion of a committée of the United States tea importers, equaled any sent to this country from the Orient. All that has been offered has always found a ready sale. Two photographic reproductions accompany the original paper, illustrating the process of picking the leaves, and a field of the plant two years old raised from the seeds. Mr. Shepard calls attention to the fact that this undertaking is largely experimental in character; he believes the present indications promise that the venture will prove profitable, although the object in view was only in part industrial. One of the chief commercial difficulties is the relatively high price of labor in the United States compared with that in the countries in which tea is produced at present. He expresses the hope that ultimately the manufacture of those very highly esteemed and high-priced teas which are rarely seen outside of the countries where they are produced can be attempted. These, because of the light "firing," do not stand transportation, and they should be consumed shortly after their manufacture.

Tea—Percentage of Caffeine in Young and Old Leaves.—Kellner's experiments have determined that the percentage of caffeine in tea diminishes with the growth of the leaves, the young leaves containing more than the old. This is borne out by the fact that cheap congon teas contain from 2.82 per cent. of caffeine against 4.09 per cent. in the higher priced teas, while, in like manner, the amount of caffeine in Souchong teas varied from 2.96 to 3.53 per cent. The method adopted for the assay consisted in extracting the tea with boiling water, precipitating the infusion with lead acetate, treating the filtrate with H_2S in presence of a little HCl, concentrating the filtrate and washings, and shaking repeatedly with chloroform. The slightly yellow caffeine remaining on distilling off the chloroform and drying contained only traces of impurity.—Pharm. Journ., July 31, 1897, 83; from Forschungs Berichte, iv, 88.

AURANTIACEÆ.

Citrus—A New Fungus the Cause of the Disease Known as "Sooty Mould."—D. M. Alpine has determined the cause of the disease of various species of *citrus* in Australia, known as "sooty mould," to be a hitherto undescribed fungus, which he names

Capnodium citricolum. It is a polymorphic species, having torula, coniothecium, and heterobotrys stages. There are two different kinds of hyphæ, one thin-walled, colorless or slightly colored, the other thick-walled and distinctly colored. The colorless hyphæ produce conids, gemmæ, and glomerules; the colored hyphæ produce conids, gemmæ, as well as sexual organs—spermogones, pycnids and peritheces. The fungus is saprophytic, living on the sweet excretions from scale-insects, and its spread appears to have been materially promoted by the destruction of honey-eating birds.—Proceedings Linnean Soc. of N. S. Wales, xxi, 469.

The "Pharm. Journal" (Nov. 27, 1897, 460) adds, that the "sooty mould" so destructive to orange trees in Florida is attributed by Mr. H. J. Webber (Bull. No. 13, U. S. Department of Agriculture) to the attacks of two pyrenomycetous fungi.

Meliola penzigi and m. camelliæ, which also derive their nourishment entirely from honey-dew or saccharine secretions exuded by certain scale insects.

"*Sooty Mould*" in various species of *Citrus* in Australia caused by a newly described fungus. See above.

VITACEÆ.

Wines—A New Non-Toxic Alkaloidal Constituent.—G. Guérin, having occasion to examine a sample of wine for the possible presence of a toxic alkaloid, found it to give distinct evidence of the presence of an apparently non-toxic base. Continuing his researches on all available varieties of wine, he obtained distinct alkaloidal reactions from all. He concludes, therefore, that a trace of an alkaloid is a natural constituent of wine, and calls attention to the fact that J. Oser in 1868 isolated an alkaloid from among the fermentation products of sugar, to which the formula $C_{13}H_{24}N_4$ was attributed.—Pharm. Journ., June 4, 1898, 525; from Journ. de Pharm., 1898, 323.

Red Wine—Artificial Decoloration.—According to H. Hugounenq, red wines are now being decolorized by artificial means so that they may be sold as white wines, which bring a better price; the decoloration being effected by means of animal charcoal and potassium permanganate. The sophistication is readily detected on incineration, but may be more quickly revealed by adding to 10 Cc. of the suspected sample, 1 or 2 Cc. of caustic soda solution and 1 Cc. of hydrogen peroxide. A deep red-brown color will be given by an artificially decolorized wine, a natural white wine merely becomes slightly darker in color. The test will answer without the addition of peroxide, if the alkaline mixture be well stirred and left exposed to the air.—Pharm. Journ., June 4, 1898, 525; from Journ. de Pharm., 1898, 321.

SAPINDACEÆ.

Guarana—Examination.—Prof. Ed. Schaer observes that notwithstanding the amount of study that has been devoted to prepared guarana (guarana paste), there are still some questions of interest concerning the drug which have not yet been fully elucidated—such questions, for instance, as the recognition of the adulterants most commonly used, the amount of caffeine and tannin present, etc. In this field, he believes, the microscope will be of service. He found very much less admixture of foreign substances than is generally stated to be present, and expresses the belief that a case of real adulteration is very rare. He accounts for the presence of foreign starches of different origins by the necessity of using such as a means of keeping the paste in a solid form. Admixture of cacao seeds, stated to be used as adulterants, he has never met with. A close examination showed very little difference in the caffeine content of the seeds, and of the prepared drugs or paste, the percentage found being usually about 3 to 3.5 per cent. The drug also contains catechin and catechutannic acid, and the presence of saponin has also been confirmed by the author.—Amer. Drugg., Oct. 25, 1897, 246; from Proc. Soc. Germ. Nat. and Phys., Sept., 1897.

POLYGALACEÆ.

Senega—Microscopic Distinction of the Northern and Southern Varieties from each other and from Euonymus and Quillaja.—L. E. Sayre communicates a brief paper, profusely illustrated with cuts showing the microscopic characters of the northern and southern varieties of senega, and of euonymus and quillaja, in section and in powder. He observes that while there is no difficulty to distinguish an adulteration of the powders of the two senegas with the powder of either of the other drugs, nor between cross sections of the two senegas, the powders of the latter cannot be distinguished from each other, and appear very much the same under the microscope.—Amer. Journ. Pharm., Sept. 1897, 433–438.

Senega—Criticism of Proposed Method of Assay.—In 1881, Langbeck proposed the determination of methyl salicylate in senega as a means of distinguishing between the fresh and the older roots, under the idea that methyl salicylate is a decomposition product of senegin, and that consequently the older roots would yield a larger quantity of the ester. This view was contradicted in 1889 by Reuter, who pointed out that earlier investigation had shown the decomposition products of senegin (saponin), to be sapogenin and sugar, and, furthermore, that his own assays have shown that the fresh roots contain more ester than old roots. Prof. Edward Kremers, assisted by Martha M. James, has now instituted a series of experiments, the results of which, while for the present to be considered tentatively, have an important bearing upon this subject. Thus he found that a sample of senega-root, which, according to Reuter's assay method apparently contained no trace of methyl salicylate, gave off the ester when distilled with water containing a few drops of sulphuric acid. Other samples of the root, which had ceased to give off recognizable quantities of methyl salicylate when distilled with water-vapor alone, yielded more ester after a small amount of sulphuric acid had been added—the percentage of ester having in one instance been raised from 0.0848 per cent. to 0.2841 per cent., being an increase of 0.1993 per cent., or more than twice the original yield. While, therefore, Reuter's contradiction of Langbeck's assumption that methyl salicylate is a decomposition product of senegin appear to be fully justified by the facts so far as known, it nevertheless may be true that the methyl salicylate given off by the root is a decomposition product of a glucoside. Furthermore, the assertion of Reuter that by means of the methyl salicylate test true senega can be distinguished from false senega does not appear to hold good, since, in addition to one sample of false senega examined by Reuter, and the roots of three species of *polygala*—not *p. senega*—examined by Bourguelot, the authors found the ester in the usual proportions in an undoubted sample of false senega. Moreover, inasmuch as the percentage of esters in true senega—as shown in a table giving the results of the examination of a large number of samples—apparently varies considerably, no percentage distinction can be laid down as a criterion between true and false. Whether the amount of methyl salicylate in senega root is at all indicative of the therapeutic value of the drug so that it can be assayed appears very questionable.—Pharm. Review, Feb. 1898, 45–49.

PAPAVERACEÆ.

Persian Opium—Commercial Form, Adulteration, etc.—Bonati states that Persian opium is sent by growers to market packed in earthenware basins. The dealers mix the opium so supplied with grape syrup and roll it out into sticks which are wrapped into white glazed paper. The opium is often adulterated with the aqueous extract of the capsules (of the poppy (?) Rep.) and of the ends of *ruta sylvestris*, while fresh poppy petals are also pulped and mixed with it. It is usually smoked in a special pipe, in quantities of 1 to 4.5 grammes at a time.—Pharm. Journ., May 28, 1898, 505; from Journ. de Pharm., v. Els. Lothr., 1898, 25.

Opium—Observation of Starch as a Component of the Smyrna Variety.—W. Kathe calls attention to the occurrence of starch in Smyrna opium obtained from the most reliable Smyrna dealers. The presence of starch has heretofore been uniformly observed in the Persian drug, but not in that from Asia Minor. He does, not, however, think that the presence of starch in Smyrna opium is necessarily an objection, since he has in all cases found the opium containing it to have a high morphine percentage.—Pharm. Ztg., Feb. 10, 1898, 122.

Referring to the foregoing observation of Kathe, Messrs. Gehe & Co. endorse the views expressed by him. They have ascertained in the course of investigation that at times it is difficult to obtain opium wholly free from starch. While an intentional admixture can be charged in case of a considerable quantity of opium, varieties are found which contain as high as 13.9 per cent. of morphine, but which nevertheless also contain starch. In such instances an intentional admixture seems to be excluded, and the presence of starch must be attributed to other causes, possibly to a change in method of collection and preparation, or perhaps the gatherers make use of some starch-containing material like flour to assist in manipulation of the sticky mass, thus introducing starch into the product. Such additions are easily recognizable by the fracture of the opium, the broken surface appearing dark, tearless and much like that of an extract. Adulteration by means of strontium sulphate also seems to have been practiced, to what extent is unknown.—Amer. Drugg., June 25, 1898, 342; from Gehe & Co.'s Bericht.

Opium—Modification of the B. P. Process of Assay.—B. S. Proctor finds several objections to the B. P. process for the assay of opium, and suggests the following as being less clumsy, and in every way more desirable: Following the lines of the B. P., take of dry powdered opium 140 gr. rub it in a mortar with 60 gr. of slaked lime and 400 gr. of water till thoroughly divided, and a smooth, pulpy condition obtained, then add 1,000 gr. of water, rub again occasionally during half an hour, and pour it upon a paper filter 3 or 4 inches in diameter, and collect the filtrate till it amounts to exactly 1,040 gr. measures; to this add 2 fluid drachms, rectified spirit, 40 gr. ammonium chloride; stir till dissolved, and set aside for twelve hours, after which the precipitate (morphine and narcotine) may be collected on a filter which has been previously dried and its weight noted. This precipitation is preferably effected in a vessel with a wide top and no shoulder, as it is so much easier to sweep out the precipitate; this should be done by the use of an imperforate india-rubber teat, on the end of a glass rod. The whole of the liquor and precipitate having been transferred to the filter, it is to be washed with morphinated water (distilled water which has been shaken with more morphine than it can dissolve, and filtered). When 2 or 3 ozs. of this has passed through, and a drop of the washings evaporated on a slip of glass shows a residue not appreciably larger than that left by a drop of the morphinated water, the filter may be filled once with pure distilled water, drained and dried at 212° F., till its weight is constant. This weight, *minus* the weight of the filter, gives the weight of morphine and narcotine. It is then to be washed with benzin till a drop leaves a negligable residue. This requires 2 or 3 drachms of benzin used in successive portions of about 20 drops, allowing it to drain between each addition. After a second drying the weight is taken as morphine, and the difference between this and the previous weight as narcotine.

The narcotine thus obtained must not be taken as indicating the percentage in the opium not yet in the liquor. Narcotine is said to be insoluble in water, but its solubility is so much influenced by the presence of the other matters in solution that its presence or absence is uncertain unless specially provided for. Much may remain in the opium marc, much in the lime precipitate, and only a small portion remains to be thrown down with the morphine.

To apply this assay to tincture of opium, not less than 1 oz. of the tincture should be taken, evaporated to 2 drachms to get rid of the spirit, distilled water added to make up to 1 oz. again, 20 grains of slaked lime added, shaken for half an hour, and 5 fluid drachms filtered off. The filtrate is to be treated with 1 drachm of rectified spirit, 10 or 12 grains of ammonium chloride, and the process finished as before. The finished precipitate gives the yield of morphine from 5 drachms of the tincture.—Chem, and Drugg., Jan. 1, 1898, 20.

Opium—Volumetric Method of Assay of Morphine as Periodide.—H. M. Gordin and A. B. Prescott propose for the accurate estimation of morphine its volumetric assay as periodide, after its separation by successive treatment with benzene, acetone and lime water. The opium alkaloids are set free by action of ammonia with certain solvents. The free narcotine, papaverine, codeine and thebaine are then removed by percolation with benzene, after which the morphine is dissolved by percolation with acetone. The acetone is then evaporated off and the residual morphine taken up by lime water which completely dissolves and purifies it. The filtered solution in lime water is then treated with diluted hydrochloric acid *to just perceptible acidulation*, and the morphine estimated as periodide as follows: To 100 Cc. of the filtrate, representing *one gramme of opium*, one-tenth normal iodine solution is slowly added from a burette while gently shaking the container (a graduated stoppered cylinder) until precisely 25 Cc. have been added. Water is then added to any convenient mark of the cylinder, which is then securely stoppered and shaken vigorously and continuously for about twenty minutes until, on standing a minute or two, the supernatant iodinized liquor is perfectly clear and transparent. The liquid is now filtered off so as to take just one-half the volume of the filtrate. In this half of the liquid the excess of iodine is titrated back with tenth-normal sodium thiosulphate solution, using starch as indicator. The number of Cc. of the thiosulphate solution consumed, multiplied by two, is subtracted from 25, the number of Cc. of iodine solution used. The remainder is now multiplied by the factor 1.89586, the product being the percentage of morphine in the powdered opium as weighed. Among other essentials to insure accuracy in carrying out this process—the details of which are given together with the method of analysis of the periodide by which the factor was established and confirmed—the authors call attention to the necessity that the acetone should not contain anything distilling below 54° C. or above 58° C.; and that after adding the excess of iodine the container be continuously shaken until the precipitate is so fully separated that the solution above is clear. The factor is based upon an analysis of *morphine periodide*, which showed it to have the composition corresponding to the formula $C_{17}H_{19}NO_3.HI.I_3$.—Pharm. Archives, June 1898, 121–126.

Opium—Assay of Commercial Samples of Powder.—Wm. K. Ilhardt reports the results of the assay of nine samples of powdered opium obtained under the label, and guarantee of official strength or specified percentage, of different houses. While only one sample was found to be below the official strength (two samples, according to the figures given, Rep.), many of them fell below the percentage of morphine claimed. These percentages, as ascertained by the official method, were the following: 15.6, 14.2, 15.4, 16.4, 12.6, 12.0, 15.4, 14.41, 14.—Proc. Mo. Pharm. Assoc., 1897, 84.

CACTACEÆ.

Cactus (Cereus) Grandiflorus—Characters, Medicinal Value and Spurious Substitutes.—The reported remedial value of *cactus grandiflorus*, Linnè, or, more correctly, *cereus grandiflorus*, in functional heart disease, and the want of uniformity in the action of preparations sold under this name, has elicited a paper from E. M. Holmes, in which he communicates the results of his investigation concerning the drug. He finds that the drug as it occurs in commerce presents the following varieties:

1. The dried stem of a *cereus*, usually five-angled, and about the thickness of a finger.

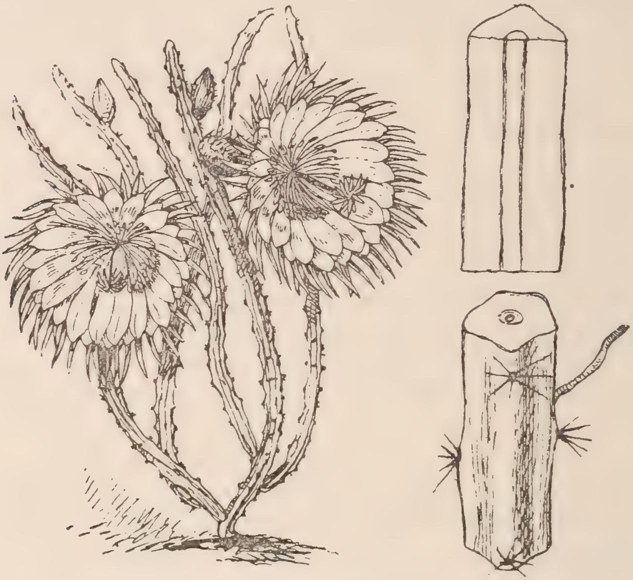
2. The fresh stems of a *cereus*, apparently the same species preserved in spirit.

3. The triquetrous stem of a *phyllocactus*.

4. *The flowers of opuntia decumana*, Haw. Besides these, he is informed, a preparation of *cereus grandiflorus*, consisting of the crushed stems and flowers covered with strong spirit of wine is imported, this preparation being diluted when required for use with a definite proportion of spirit, in order to form the tincture. Besides a botanical description of the flowers of *cereus grandiflorus*, which is taken from the "Bot. Mag.," Vol. 62, No. 3381, a description of the genuine drug is given, as follows: Stems in pieces of varying length, about 1½ to 2 centimeters in diameter,

cylindrical, with five to seven angles, furnished along the angles at intervals of about 2 centimeters with small tufts of 6–8 very short spines, about 2 Mm. long, and at irregular intervals of 5–15 centimeters or more, with a branched rootlet. Internally, the transverse section presents a central woody ring, about 3 Mm. in diameter, the remainder of the stem presenting a spongy parenchyma with numerous crystals or "sphæraphides" immersed in it. The stems and flowers of the plant are shown by Fig. 71, while

FIG. 71.



Cereus grandiflorus.

Fig. 72 shows a flower of *opuntia decumana*, natural size, and Fig. 73 a longitudinal section of the same showing the position of the ovary. Concerning the latter, Mr. Holmes says that no good figure of the flower has heretofore been extant. The flower buds, which are clavate and cylindrical, cover the upper edge of the stem segments to the number of six or more. The outer and thicker sepals pass gradually into the petals, which are of a pale sulphur color, and thinner in substance. The anthers are innate, and the stigma has about six lobes. The seeds are small and numerous. When in flower, the calyx tube is firmly adherent to the upper part of the fleshy calyx tube, but when the flower is over the calyx tubes separate in the form of an obovate or shortly funnel-shaped piece, leaving a cup-shaped depression with a central scar at the top of the ovary. In this condition they are removed and dried, and form the drug of commerce.

The two preparations which are chiefly used in commerce at the present time appear to be (1) a tincture made from the crushed fresh stem and flowers of *cereus grandiflorus*, and (2) a tincture made from the dried *opuntia* flowers. These drugs have at Mr. Holmes' request been examined preliminarily by Mr. E. H. Farr, who finds the *cereus grandiflorus* to contain some waxy and fatty bodies, several acid, slightly acrid, glucosidal resinous bodies, which are fairly soluble in water, and also an alkaloid, which is present in very small quantities only. Besides these there is much mucilaginous matter present in the stem, and probably a sugar directly reducing Fehling's solution. The *opuntia* flowers seem to contain neither alkaloid nor glucoside. There is, however, a powerful yellow coloring matter present in the opuntia flowers, which has not been found by Mr. Farr in *cereus grandiflorus*, and which will probably serve for distinguishing between the commercial tincture prepared from the one and the other. On adding a drop of ammonia solution to a strong solution of the resin matter of the opuntia flowers in ether or in alcohol, a lemon-yellow or almost chrome-yellow is thrown down. Ether will remove it from an aqueous solution, but water faintly alkaline with ammonia immediately recovers it from ether. Anhalonium flowers or muscale buttons contain a similar, if not identical, yellow coloring matter.—Pharm. Journ., Aug. 21, 1897, 165–167.

FIG. 72.

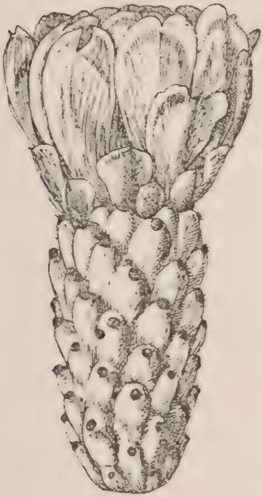
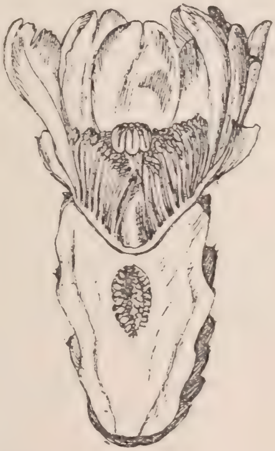


FIG. 73.



Opuntia Decumana.

True and False Cactus Grandiflorus—Worthlessness in Heart Affections.—The attention of Dr. Gordon Sharp having, in 1890, been directed to the reputed value of night-blooming cereus flowers as a so-called heart tonic, he has since then had an extensive experience with various commercial tinctures and preparations, as well as with tinctures of his own make from dried flower-tops supplied in the markets of Manchester, Leeds, London and Edinburgh, under the name of night-blooming cereus. With the assistance of Mr. J. H. Hoseason, he has investigated the chemistry of this drug in the belief that it was derived from *cereus (cactus) grandiflorus*, and partially recorded his results in the "Practitioner," of September, 1894. The investigations of Mr. Holmes, recorded in the preceding abstract, make it evident, however, that he had experimented with the flower tops of *opuntia decumana*, Haworth, and not with those of *cereus (cactus) grandiflorus*, Miller. The conflicting therapeutic results obtained at different times with the same preparation, as well as the difference in the appearance of the tincture supplied, made it desirable that further therapeutic observations should be made with preparations of undoubted origin, and he has since experimented with tinctures made from both cereus and opuntia, as well as with various preparations labeled cactus but evidently made from opuntia, these preparations bearing the assurance of medical men that they possessed the virtues ascribed to the genuine drug. Careful tests made with cereus alongside of strophanthus and fox-glove, convince him that cactus, whether genuine or spurious, is worthless, and should be discarded as a remedial agent. Both drugs contain a certain amount of resins and pectin (or a similar agent), and these substances have a stimulant action on the kidneys—particularly if administered, as is done in the West Indies, in the form of decoction. Consequently they might prove useful in dropsies; and since most of these have their origin in heart affections, the transition from the treatment of dropsy with these separated remedies to the treatment of heart disease is easy of explanation.—Pharm. Jour., Dec. 18, 1897, 539–540.

Muscale or Mescal Buttons—Past Experiments Probably Referring to Several Species of Anhalonium.—Since Dr. Briggs, of Dallas, Texas, called attention to muscale or mescal buttons, in 1887 (see Proceedings, 1888), the plant yielding the drug and described by Henning, of Berlin, as a new species, under the name

Anhalonium lewini, has been the subject of a number of investigations. Dr. E. M. Holmes says, however, that there is reason to believe that other species have been used in experiments, especially *a. williamsi*, which differs from *a. lewini* in some important particulars. In the latter the body is comparatively thick, and surmounted by a top, which is composed mainly of the blunt leaves of the plant. In the center of this top is a tuft about ½ to 1 inch in diameter, composed of yellowish-white filaments or hairs. These hairs, according to Lewin and Henning, are 6 to 9 Mm. long, and from them protrude small blossoms, about 1 Cm. long and about 4 Mm. broad, the eight outer segments being 5 Mm. long, dark green at the back, and having a long, transparent, angular point. The twelve inner segments are of a pale pink color, spathulate, blunt and smooth-edged. The stamens are attached one above the other to the petals, the filaments being 1½ to 2 Mm. long and white, and the anthers barely ½ Mm. long and yellow. The pistil is open at the top, but is not so high as the petals, though larger than the stamens. The fruit is an oblong berry, 6 Mm. long, and contains about fourteen seeds, which are about the size of a mustard seed. In

Anhalonium Williamsii, the tufts of hair are in single bunches, and are of a purer white, silkier and longer, the hairy cushions not being so strongly developed, the petals are pointed and have a dark line on the outside, and the pistil is shorter than the stamens. Mr. Holmes has received two living specimens of *anhalonium*, the one designated to be *a. williamsii*, the other *a. lewini*, but he refers both of them to *a. williamsii*, since the peculiar hairy surface of *a. lewini* is absent in both, the hairs forming distinct, small, cylindrical tufts, from which the flower arises. The plants consist of a green, convex, fleshy head, about 1 to 2 Cm. high, and about 5 to 6 Cm. in diameter. The portion underground is brownish and fleshy, and shaped like a carrot, and appears to be formed by the withered bases of successive growths of the fleshy disc. One of the plants flowered in August last, and produced a single fruit, which, however, did not ripen seeds. The flowers were small, pink, and resembled in appearance those of the *Mesembryanthemum* genus. The fruit was oblong, succulent, and of a pinkish color. Concerning the drug itself, Dr. Holmes expresses the opinion that the investigation so far made gives sufficient evidence that the drug is worthy of further investigation.—Pharm. Journ., Dec. 11, 1897, 520.

CUCURBITACEÆ.

Citrullus Colocynthis—Botanical, Historical and Pharmacognostic Description.—Prof. John Uri Lloyd contributes an interesting study of the colocynth plant, in which he gives an account of the facts that have become known concerning it—historical, botanical, chemical and pharmacognostic—from the earliest authentic records (Hieronymus Bock, 1536), to the present time. The paper is accompanied by a handsome drawing of the plant—a flowering branch, natural size—and of the more important botanical features, including a transverse section of the fruit. A bibliography, embracing twenty-one references, is given.—West. Drugg., June, 1898, 243–246.

PASSIFLORACEÆ.

Papaw—Collection of the Juice.—F. B. Kilmer describes the following method which he finds best adapted to the collection of the juice from the fruit of *carica papaya* in the Island of Jamaica. Cut an incision lengthwise of the fruit, not over ⅛ of an inch in depth, lest it penetrate to the interior and the juice thus be lost. The milk will run quite freely for a time, but soon coagulates, and the flow stops. Tin pans are placed around the tree to catch the drippings of milk. After the flow has ceased, it is good practice to brush the coagulum into the pans, and to make a fresh cut, when another, but smaller, yield may be obtained. These scorings should be made about ½ inch apart all around the fruit. The tapping of the fruit should be early in the morning, before the sun is very high, and the proper period is when the fruit is green and full, but before it is ripe. The milk must be dried the same day that it comes from the tree, and *must* be dried in the sun, not by artificial heat. The yield is largest just after a rain storm or a spell of wet weather. If, from any cause, the milk cannot be dried in the sun on the day it is gathered, it may be preserved by mixing it with some naphtha or benzine. While any amount of exposure to the heat of the sun—which is done by exposing thin layers of the milk on glass plates—does not appear to harm the papaw juice, artificial heat destroys it.—Amer. Jour. Pharm., July, 1897, 370; from Bull. Bot. Dep., Jamaica, *4*, 68.

MYRTACEÆ.

Pomegranate Rind—Percentage of Tannin, etc.—Prof. Henry Trimble has subjected to examination the fresh rind of some Spanish pomegranates purchased in the Philadelphia market, mainly with the purpose of verifying or refuting the reported high percentage of tannin. He found the fresh rinds to contain 56.66 per cent. of moisture, and the absolutely dry substance to contain 3.92 per cent. of ash and 28.38 per cent. of tannin. Others having reported 20 to 30 per cent. of tannin, the author's results agree well with previous statements. Combustion of the pure tannic acid and its reaction with the normal reagents prove it to be identical with gallo-tannic acid, and this is in accord with the results obtained by Culley with the tannin of pomegranate root-bark.—Amer. Jour. Pharm., Dec., 1897, 634–636.

Eugenia Jambolana—Varieties and Medicinal Value.—Norman S. Rudolf states that eugenia jambolana occurs in all parts of India as a large, handsome tree, somewhat resembling the walnut, but that there are three varieties grown in gardens, distinguished by the name "phalenda," "jamun," and "kut-jamni." The plum-like fruits of these jambuls differ mainly in their size and taste, but all three are good to eat, the pulp being luscious, resembling that of the plum, but being rather more acid and astringent. The fruit of the jambul growing wild is small, black like the cultivated, but has a large stone, and resembles in taste the English "sloe." The reputation of jambul among the native physicians as a remedy for the treatment of diabetes appears to be so well founded that it may be regarded almost in the light of a specific. The ripe fruit is usually directed to be eaten in season, while during the rest of the year it is administered by physicians either as fruit preserved in spirit, in the form of juice of the fruit, or in the form of syrup. It is noteworthy, however, that the natives of China believe this pulp of the dried fruit to be almost worthless. The author suggests that for use in European and American medicines the best form would be either in the whole fruit preserved in alcohol, the powdered seeds, or a fluid extract of the seeds. Care, however, is necessary in selection. To obtain the seed fit for use is not easy. It is necessary to supervise the picking of the fruit, taking care that the tree from which it is gathered is of the right variety of jambul, and that no "windfalls" or rotten fruit are included. Worms are very common in the ripe fruit, and it is necessary to pick it over carefully and remove all damaged fruit, otherwise the whole lot of seed will be worm-eaten and useless. The pulp is removed by hand. The seeds are dried in the shade, and afterward picked over, so that any that appear damaged may be removed. As the collection of the seed has to be done in the hottest part of the plains of India, and during June and July, it is only natural that most people have been content to use what could be bought in the bazaars, without troubling to supervise the collection or inquire about its source. Almost without exception the jambul seed found in Bombay, Calcutta, and other bazaars was old, dried up, worm-eaten, dirty, and apparently utterly unsuitable for medicinal use. In several samples other seeds were present, and it seemed almost as if the seeds had been swept up from places where people had thrown the stones after eating the fruit.—Bull. Pharm., Jan., 1898, 6.

Yass Leaves—Botanical Source.—The "Chem. & Drugg." (1898, 367), states that a drug offered in the London market under the name of "yass leaves," consists of the leaves, fruit and twigs of the common myrtle, *myrtus communis*, together with broken leaves, twigs and fruits of a *pistacio*, probably *p. khirjik.*

ROSACEÆ.

Prunus Virginiana—Distinctive Tests for Barks Collected in Spring and in Autumn.—Grace E. Cooley has been engaged in determining a test that shall be sufficient to determine, without the use of the microscope, whether a sample of wild cherry bark has been collected in the spring or in the autumn. She finds that in spring, when the bark is least valuable, it is richest in tannin, and upon this bases the following test, which is carried out as follows:

Upon the surface of distilled water in a watch-glass, sprinkle a little of the powdered drug, which will be spread, forming a thin film. Let it stand ten seconds, and then drop into it a drop of a one-per-cent. solution of ferric chloride. If the bark was collected in the spring, a cloudiness will appear in the water, from the greenish precipitate which is immediately formed. If the bark was collected in autumn, there will be no noticeable precipitate under twenty seconds. Powders of Nos. 20 and 50 exhibit this test equally well. To confirm the value of this test, the author admits the necessity of making tests that establish the fluctuation of the tannin content at different periods throughout the year.—Amer. Jour. Pharm., Aug., 1897, 414–416; from Jour. Pharmacol., *4*, 167.

Almonds—Cultivation in Tunis.—Sir H. H. Johnston, British Consul at Tunis, gives some practical information concerning the cultivation of almond trees, and expresses the opinion that, while at present the trees are usually disseminated in the gardens, it would be quite practicable, as well as profitable, to cultivate them in masses as orchards. The trees are planted at a distance of 12 meters apart, and as the tree is not an easy one to transplant, two seeds are sown together where it is intended to grow, and the least vigorous plant of the two is pulled up. They are sown at the commencement of winter, are grafted when between two and three years old, and begin to produce fruit in the fifth year, though they do not arrive at the full-bearing stage until the fifteenth year, remaining vigorous up to fifty years. The trees are not pruned, because the scars cause an exudation of gum which weakens the tree. The dead wood only is cut off.—Pharm. Jour., April 23, 1898, 406.

LEGUMINOSÆ.

Gum Arabic—Abundance about Jeddah in Arabia.—According to Consul Devey, gum arabic is to be found in great quantities about Jeddah and he is of the opinion that a considerable trade might be done if collection on a large scale should be attempted. The red quality exists to the east of Medina, and the superior white south of Mecca.—Pharm. Jour., Nov. 6, 1897, 416.

African Gums—Varieties from the Hinterland.—K. Dieterich describes three kinds of gum which are derived from the Hinterland of Angra Pequena, Southwest Africa, all of which have good adhesive properties, and are well adapted for technical purposes, but cannot be used as substitutes for either gum arabic or Senegal gum, since they do not correspond with them in their chemical characters.

Gum "*Flach,*" which dissolves in ten parts of water, forms a solution which is completely precipitated by alcohol. It has a sweet taste, but does not reduce Fehling's solution. A mucilage prepared in the proportion of 1 : 2 has a brown color, is somewhat cloudy, and is gelatinized with ferric chloride.

Gum "*Amrad,*" produces in the proportions 1 : 10 a solution having a sweet taste and acid reaction, but is not precipitated by alcohol or salts of lead, nor does it reduce Fehling's solution. The 1 : 2 mucilage prepared from it is cloudy and gelatinizes with ferric chloride. The aqueous solution of the third variety of gum,

Gum "*Aurnar,*" is rendered cloudy by alcohol, and is precipitated by lead subacetate, but not by lead acetate. In further distinction from the other two varieties, it reduces Fehling's solution. The 1 : 2 mucilage is colored, not clear, and gelatinizes with ferric chloride.—Apoth. Ztg., 1898, 265.

Acacia horrida—An African Gum-Yielding Species.—According to F. Gessort, *acaica horrida*, a tree growing in Southwestern Africa, not alone yields a gum closely related to gum arabic, but also a bark rich in tannin, and, from the flowers, a pleasantly fragrant oil, while the hard wood is useful for posts. The tree, which occurs along the banks of streams, is from 20 to 25 feet high, and its stem, which is covered by a dark gray bark, is from 1 to 1½ feet thick. The branches are smooth, bear large white, straight thorns, and have bi-pinnate leaves, with small, linear, blunt leaflets. The agreeably odorous flower opens in January or February. They are long-stemmed, yellow, and form a spherical inflorescence, while the fruit is an elongated, sickle-shaped, smooth and leathery pod, containing many seeds —Apoth. Ztg., 1898, 93.

Hartwick also calls attention to this new African variety of gum. The new gum consists of colorless to faint-yellow pieces, with sharp edges, and is readily soluble in water, forming a very consistent mucilage—the 1 : 3 solution compared with the official mucilage being greatly superior to the latter.—Chem. Ztg., 1897, xxi., 256.

Acacia Catechu—Historical, Botanical and Pharmacognostic Description.—Prof. John Uri Lloyd communicates a study on *acacia catechu*, in which he reviews its history, botanical characters, cultivation, characters of its products and their constituents, their uses, etc. The paper is illustrated by a drawing showing the areca palm and its principal botanical features. A bibliography, embracing fifteen references, is appended.—West. Drugg., May, 1898, 195–198.

Catechu—Nature of Yellow Coloring Matter.—A. G. Perkin, in continuation of his investigations of the yellow coloring matter of plants, finds that the yellow coloring matter of *uncaria gambier*, as well as of *acacia catechu*, is resorcin ; though the amount yielded by the latter was not more than a trace.—Jour. Chem. Soc., lxxi., 1135.

Senna — Histological Distinction Between the India and Alexandria Leaves.—In the fact that the results of the histological examinations of senna leaves obtained by Prof. L. E. Sayre and by Dr. Schneider (see Proceedings, 1897, 551 and 554) differ somewhat on essential points, R. H. Dennister has submitted the question to a further investigation, and now communicates his results. In beginning the work, the epidermis on different portions of authentic leaves of both the Alexandrian and Indian material was examined. Portions of the epidermis were taken from both the upper and lower sides of the leaf, and from the tip, middle and base in each case. The characteristics noted were then tabulated under the following headings : (1) Number of hairs on a piece of the epidermis visible in the field, using a B. and L. microscope, 2-inch eye-piece and 1/6 inch objective (*i. e.*, 0.125 sq. Mm.). (2) Distance these hairs are apart. (3) Form and size of hairs. (4) Number and shape of epidermal cells around hairs. (5) Shape of stomata. (6) Number of "neben zellen" around stomata. (7) Form of "nebenzellen" around stomata.

(8) Size of epidermal cells. Several leaves of each species were examined in this way, and the characteristics were found to be quite uniform in the same species. Omitting the details of the results obtained, the following general directions for the examination of the powders may find place here. In making the test, at least five slides should be prepared and studied. The mount is made by placing a drop of chloral-glycerin on a slide, covering with powder and blowing off all that does not adhere to the drop. The cover is then placed and the slide heated over a gas-jet until bubbles form. By taking drops of uniform size, this method gives more satisfactory results than the method of shaking the powder in a vial suggested by Sayre. Then

1. Search for detached hairs and average the number found in a number of fields. If the average falls below 16, the presence of India senna may be suspected.

2. Search for characteristic pieces of epidermis, the principal ones being those showing the distance of the hairs apart (2) and the number of "nebenzellen" around the stomata (6). For these purposes it will be necessary to consult the author's paper, in Pharm. Review, March, 1898, 105–108.

Locust Beans—Occurrence of a New Ferment.—Effront, in the course of the study of the fruits of *ceratonia siliqua*—familiarly known as the "locust bean"—has isolated a new zymase,

Caronbinase, which is developed during the germination of the seeds of these fruits. It acts energetically on

Caronbin, a carbohydrate existing in the fruits, readily liquefying its gelatinous solutions with the production of an abundance of a reducing sugar, precipitable by alcohol but soluble in water, producing dextro-rotatory solutions. The ferment appears to be most active at between 40° and 50° C., and is destroyed at 80° C. When caronbin is treated with dilute mineral acids, a peculiar sugar,

Caronbinose, is formed. This is a syrupy, non-crystalline body, soluble in water and in alcohol, and has the formula $C_6H_{12}O_6$. When treated with phenyl-hydrazine two osazones are obtained: the one crystallizing in prisms, insoluble in boiling absolute alcohol, melting at 183° C. without decomposition, and having the formula $C_{12}H_{18}N_2O_5$; the other crystallizing in needles, melting at 198° C., and having the composition $C_{18}H_{22}N_2O_4$.—Pharm. Jour., Aug. 28, 1897, 191; from Compt. rend., cxxv.

True Kino—Cause of Scarcity a Want of Local Knowledge.—A writer in "Chem. & Drugg." (Feb. 26, 1898, 355) speaks interestingly on the subject of kino, and particularly upon the causes that have tended to make it scarce in the market. He observes that the Indian or true kino tree, *pterocarpus marsupium*, is a large deciduous tree, extending from Ceylon through Southern and Western India, to as far north as Banda in the north-western Provinces, and the Rajmaht Hills in Behur—*i. e.*, to about 20° north. It grows to the greatest perfection over the Western Ghauts, throughout Travancore, Malabar, South Canara, and parts of Coimbatore. It furnishes a most perfect and invaluable timber, suitable for any in or out-door work, it being unaffected by sun or wet ; while, owing to the large amount of essential oil it contains, white ants and other insects give it a wide berth. The fracture, which is good, exhibits a wiry splinter, and the wood is eminently well suited for ordnance purposes. The sapwood is small, and the heartwood, which takes a fine polish, is brown, hard, and durable. Little or nothing seems known about the essential oil above referred to. The juice, or gum kino, is obtained by making a perpendicular incision, with lateral ones leading into it, in the trunk of the tree, at the foot of which is placed a vessel to receive the juice. In Canara little cups made of leaves are used, and the gum there collected assumes the shape of concavo-convex cakes, 3 to 4 inches in diameter, which are broken up and garbled by the dealers. The main supply, however, is from the government forests in Wynaad (North Malabar). At the foot of the Ghauts lies Anjurakandy, the factory at which the first supply is supposed to have been prepared for the market, early in this century, from juice brought down from the country above the Ghaut.

The author suggests that it is a want of local knowledge that perhaps explains the dearth of true kino in the London market, and which is otherwise somewhat difficult to understand. The ports of outlet for the various tracts would be Cochin and Alleppi for the native state of Travancore ; Calicut and Tellicherry for Malabar, in which would be included the main sources of supply—namely, the Nelliampathy Hills, the Nilambur Forests below and on the Ghauts, and the extensive reserves in Wynaad. The produce of Coimbatore would also find its way to Calicut, as being the nearest port, while gum collected in South Canara would be shipped at Mangalore, but means of communication in that district are backward, and the roads are indifferent. In some of the government forests (notably those of Coimbatore) the gum has never even been collected. In others the tapping, &c., is done by the rangers under the supervision of the district forest officers, while in yet others the right to tap the trees, subject to the condition of its being done properly and without causing undue damage, may be easily obtained. The right is put up to auction, together with that of collecting other "minor forest produce," such as bee's wax, &c. The cost of collection cannot be heavy, for two or three years ago the government medical stores at Bombay were supplied by the district forest officer of North Malabar at 8 a. per pound, and about the same time he was glad to sell a second supply at 1 r. per pound, so that it seems his difficulty was to find a market.

It would appear, therefore, that, were inquiries made in the right direction, there should not be much difficulty in obtaining a fair supply for the drug-market, while, on a large demand being created by an increased use of the gum in the arts, many a coffee-planter would be glad to grow *pt. marsupium* as a shade-tree in place of some of the less profitable timber now left standing.

Referring to the foregoing paper, A. E. Bertie-Smith observes that he has long known the causes of the dearth of true kino to be essentially as there stated. He maintains that any reasonable quantity of kino could be procured but for one of the most successful of corners that has been in operation many years. The principal ports from which gum-kino is usually shipped are Alleppi and Calicut, and at these ports and at others, such as Tellicherry and Cochin, are settled some three or four old European firms who control the export-trade. One or more of these firms have succeeded in getting into their hands the whole of the arrivals of gum-kino from up-country districts, with the result now so well known in the London drug-market. For some years after the great rise in price at the London drug-auctions kino could be obtained in small quantities in the Bombay drug-bazaar at one-third of the advancing London rate, owing to the fact that a certain amount came up from Malabar to Bombay in bugalows (country sailing-boats) shipped by natives to natives, which consignments the European houses would know nothing about. The author concludes that until the demand for kino ceases altogether it will, no doubt, be much more profitable for the monopolists to buy all that comes to hand, shipping only a moiety and destroying the rest, than to ship the quantities formerly exported and sold for just what the London wholesale druggist cared to give at the drug-auctions.—Chem. & Drugg., Mar. 5, 1898, 396.

Kinos—Australian Substitutes for the Official Variety.—Joseph Bosisto, in reply to a B. P. C. Blue List Question, No. 49, concerning possible substitutes for the variety of kino hitherto official, but almost unobtainable now, states that, although *pterocarpus marsupium* and other leguminosæ yielding kino are not known to exist in Australia, there are numerous species of myrtaceæ that will yield kino. Unfortunately the products from these, with the single exception of *eucalyptus rostrata*, are characterized by their sparing solubility in water, and hence of no commercial value. This arises from the kino not being collected within a few days after its appearance on the outer bark, the exudation rapidly undergoing change in the prevailing bright sunlight, together with the warm thermal line existing both night and day. In the case of the exception,

Eucalyptus rostrata, the kino is so exceedingly abundant that, being unable to force its way through the hard, tough outer bark, it lodges itself in treacle form in large orifices or carbuncles between the wood and the bark, *one or two* bucketfuls of the fluid having been obtained in the author's experience by simply boring a small orifice into the swollen part. This liquid kino, when being evaporated in a vacuum pan, is obtained as a beautiful ruby-red kino, which is thoroughly soluble in water or spirit, and the supply of it would be very great if only a remunerative market opened.—Trans. Brit. Pharm. Conf. (Year-book of Pharm.), 1898, 445-446.

Copaifera officinalis—Historical, Botanical and Pharmacological Description.—Prof. John Uri Lloyd, after a brief botanical description of *copaifera officinalis*, its habitat, &c., accompanied by drawings showing a flowering branch and the principal organs of the plant, gives a historical sketch of the drug derived from it, as well as from other species of *copaifera*, and a review of the constituents and adulterants of the copaiba of commerce. He observes in a summary of his study on this interesting drug that the work has been as unsatisfactory as it is enticing. Possibly no other drug is more unfortunate. Its uncertain origin, owing to the number of species that yield it, as well as the sophistication at home and abroad, render attempts at scientific exactness in tests a problem for the future. Unquestionably the Pharmacopeia is wisely conservative in its method concerning a drug that has no precise origin, and that admits of such possibilities in the line of admixtures. A bibliography of seventeen references closes this paper.—West Drugg., Feb., 1898, 54-57.

Surinam Copaiba—Characters.—The following characters are given by Poole to *Surinam copaiba*. It is yellowish, not very clear, but not opalescent as is generally stated; has the consistence of wood oil, and the s. g. 0.942 at 15° C. It mixes with ether, chloroform, carbon disulphide, and petroleum ether in all proportions, and is soluble in 4 or 5 parts of absolute alcohol, forming a clear solution, while a smaller quantity produces a turbidity. When fresh, this copaiba yields by distillation 77 per cent. of volatile oil, but this percentage is diminished by age; this oil is colorless, has the s. g. 0.910, and boils at 250° to 260° C. From the residue remaining after distillation, diluted alcohol extracts copaivic acid, which when crystallized melts at 130° C. One gramme of the copaiba combines with 0.094 grammes of iodine; its saponification number is 34.—Pharm. Zeitg., 1898, 129; from Nederl. Tydschr. v. Pharm.

Copaiba—Commercial Characters, Tests of Distinction from Gurjun Balsam, etc.—In a former paper (see Proceedings 1896, 628), Lyman F. Kebler had made careful comparison of the available methods for detecting gurjun balsam in copaiba. The conclusions then arrived at, that a modification of the glacial acetic acid test gives the most trustworthy results, has since been confirmed in the author's experience with numerous samples. Having accumulated ample material in order to make a further study of the subject, he has examined the samples at his command, and gives the result in a table, exhibiting the source, variety, specific gravity, percentage of oil, and specific gravity of oil. The table also includes the results of the examination of three samples of gurjun balsam, and of two samples of commercial oil of copaiba, one of the latter being pure, the other adulterated with gurjun oil. The results show that genuine copaiba oleoresin of commerce contains a larger percentage of volatile oil than is permitted by the present requirements of the U. S. P. These requirements have undoubtedly wrought hardships for some well meaning druggists, for only the solidifiable copaiba is recognized, and practically none but an unofficial article is used. Of five samples of Para copaiba examined two contained 90 per cent., one 92 per cent., another 88 per cent., and the fifth 54 per cent. of volatile oil, while five others from various sources, contained 53, 56, 62, 76 and 23 per cent. of volatile oil, the latter being the so-called "solidifiable." But even for solidifiable copaiba the range of the U. S. P. sp. gravities is rather too low; in the author's opinion 0.9800 to 1.0173 would be better. The copaiba most largely used is one containing from 40 to 60 per cent. of oil. Such a copaiba and the volatile oil should be made official; the *resin of copaiba* and the *solidifiable copaiba* should be dismissed, and consequently also the *mass of copaiba:* for in the large territory east of Detroit, Mich., through Canada to the Atlantic, and south to Philadelphia, there are only 3½ pounds of resin and 5 pounds of solidifiable copaiba sold for every 1000 pounds of the copaiba containing 40 to 60 per cent. of oil.—Amer. Journ. Pharm., Nov., 1897, 577–579.

Balsam of Peru.—Systematic Method of Examination.—Hirschsohn proposes the following systematic tests for determining the quality of balsam of Peru: (1) The balsam mixed with half its weight of calcium hydrate and heated for half an hour on the water bath should not give a firm mass. (Absence of turpentine, resin, Canada balsam, copaiba, storax, alcohol, Siam or Sumatra benzoin, and tolu balsam.) (2) One volume of balsam mixed with four volumes of acetic acid of 80 to 82 per cent. should give an opalescent or only slightly turbid solution, from which no oily drops should separate in about two hours. (Absence of resin oil, copaiba, gurjun balsam, and fatty oils.) (3) The petroleum ether extract of the balsam (1 balsam, 5 petroleum ether), shaken with an equal volume of a diluted aqueous copper-acetate solution (1 per mille), should not be colored bluish-green or green. (Absence of resin, turpentine, Canada balsam, resin oil, copaiba, storax, fatty oils, and tolu balsam). (4) The residue on evaporating the petroleum ether extract covered with hydrochloric acid of 1.19 sp. gr., should not be colored. (Absence of gurjun balsam.)—Zeit. Oest. Apoth. Ver. 1897, 525.

Peru Balsam—Examination of Varieties from Honduras.—K. Deiterich has obtained authentic samples of Peru balsam from Honduras which represent the pure natural product of the tree. The author distinguishes three qualities of the product, representing the first, second, and third flow respectively, mixed with a few traces of bark. The three varieties differ from the commercial products by being much thicker, also much clearer and of darker color, and having a more intense balsamic odor. The author contradicts the usual supposition that the same tree furnishes balsam of the same quality, since the three samples examined showed different ester numbers. The balsams examined furnished 77 per cent. of aromatic bodies (cinnamein, etc.), and only 13 per cent. of resin ester, while the commercial products never have more than 65 to 75 per cent. aromatic substances. The proportion of cinnamein differs to the same extent, and the residue insoluble in ether was found to be 4.38 per cent., or 1.5 to 3 per cent. more than those of the commercial products. On this basis a balsam having less than 65 per cent. of aromatic substances and more than 28 per cent. of resinous matter should be considered as of doubtful quality.—Berichte d. Pharm. Ges., 1897, 437.

Balsam of Peru.—Use for preparing a superior *Flexible Collodion*, which see under "Pharmacy."

Licorice Root—Cultivation in New South Wales. — W. Finsebach describes two samples of Spanish licorice root grown on the Government Experimental Farm, New South Wales, the stolons or suckers, only two years old, being 12 feet long. These samples proved on analysis to be of first class quality, although they had not secured full maturity, the plant requiring in Italy three, and in wet seasons even four years to mature. Mr. Finsebach considers the climatic conditions of the Linsmere district, N. S. W., to be favorable to the cultivation of licorice, and that this may become a profitable crop. — Amer. Jour. Pharm., Dec. 1897, 645; from Pharm. Journ. Australia, Aug. 28, 1897.

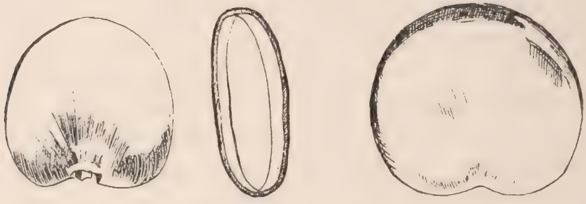
Indian Licorice—A Substitute for Glycyrrhiza Glabra.—Norman S. Rudolf calls attention to the beautiful jungle creeper,

Abrus precatorius, which is found growing in all parts of India, and is of interest, not alone because of the use to which its seeds are put in ophthalmic practice, but also because its roots form an excellent substitute for licorice (*Glycyrrhiza glabra*). From the roots a tincture or fluid extract may be prepared which resembles the corresponding preparation extracted from true licorice, but has a more bitter taste. The medicinal properties of the two kinds of licorice are very similar. Speaking of the seeds, after mentioning their use as weights on account of their great uniformity in size, and their use as a counter-irritant in the treatment of ophthalmia, the author states that in their use as a cattle poison they are of the greatest interest to the chemist and toxicologist. The motive in case of such poisoning may be spite, but it is more usually one of gain, because when a bullock or cow dies in a village it becomes the property of the lowest caste—either as their perquisite, or by purchase for a trifling sum—who find employment in skinning or preparing hides. The method of preparing the poison, the mode of administration—which appears to be subcutaneous—and the toxicological effects are described in some detail. Administered internally the seeds seem to be uncertain in their effects, 40 grains of the powdered drug having in the author's experience proven fatal to a dog, while in the case of another dog, of almost the same size, 7 drachms were administered without apparent effect.—Bull. Pharm., Sept., 1897, 401.

False Calabar Bean—Offer in the New York Market.—Certain New York dealers have sent to the "Bulletin of Pharmacy" (June, 1898, 269) samples of seeds and seed pods which they have recently been offered by a South American dealer as calabar beans. Upon examination, they proved to be the seeds of some species of *mucuna*, a leguminous genus of climbing plants of tropical regions. The seeds of several species are picked up along the coast of Florida and the West Indian islands, and are known as "Florida sea-beans." Calabar beans *(pysostigma)* being a native of Africa, dealers should be wary of accepting as such beans emanating from other districts.

Calabar Bean—Adulteration with the Seed of Entada Scandens.—W. B. Day calls attention to an adulteration of calabar bean, amounting to 3 per cent., with the seeds of a legume which was identified by Prof. J. U. Lloyd to be *entada scandens*, Benth., a large shrubby vine, indigenous to the East Indies and to tropical countries generally. The fruit is a legume, measuring from 1 to 8 feet in length, and 4 to 5 inches in breadth, constricted between the joint, each joint bearing a single seed. So great is the difference in size and appearance between calabar bean and this entada seed (shown by Fig. 74 in ½ natural size), that no one would fail to notice this admixture in the whole drug. In the powdered drug the great difference in size of the starch grains (as shown by Figs. 75 and 76), would offer a certain means of distinction; the starch grains of entada seeds measuring but 5 to 6 microns, whereas those of calabar bean measure from 40 to 60 microns. Further, the cotyledons of entada strike no color with caustic potash solution, while those of physotigma give a pale salmon color. Entada seeds are said to be used as an antifebric medicine by the Ghaut (India) people, while according to Rhumphius they are, in Java and Sumatra, roasted and eaten like chestnuts. The seeds often are car-

FIG. 74.

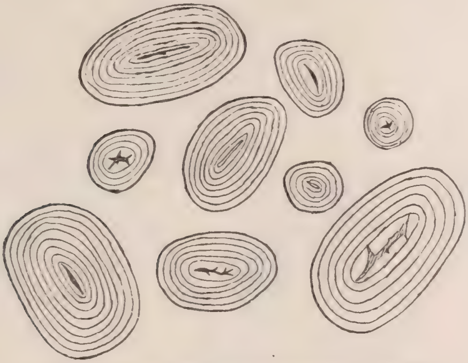


(½ natural size.)

Entada Seed.

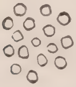
ried by the gulf stream from the West Indies to the Western shores of Scotland. Though not regarded as edible, they have been sold in the London market under the name of Indian filbert.—West. Drugg., March, 1898, 101.

FIG. 75.



STARCH GRAIN OF PHYSOSTIGMA. ×400.

FIG. 76.

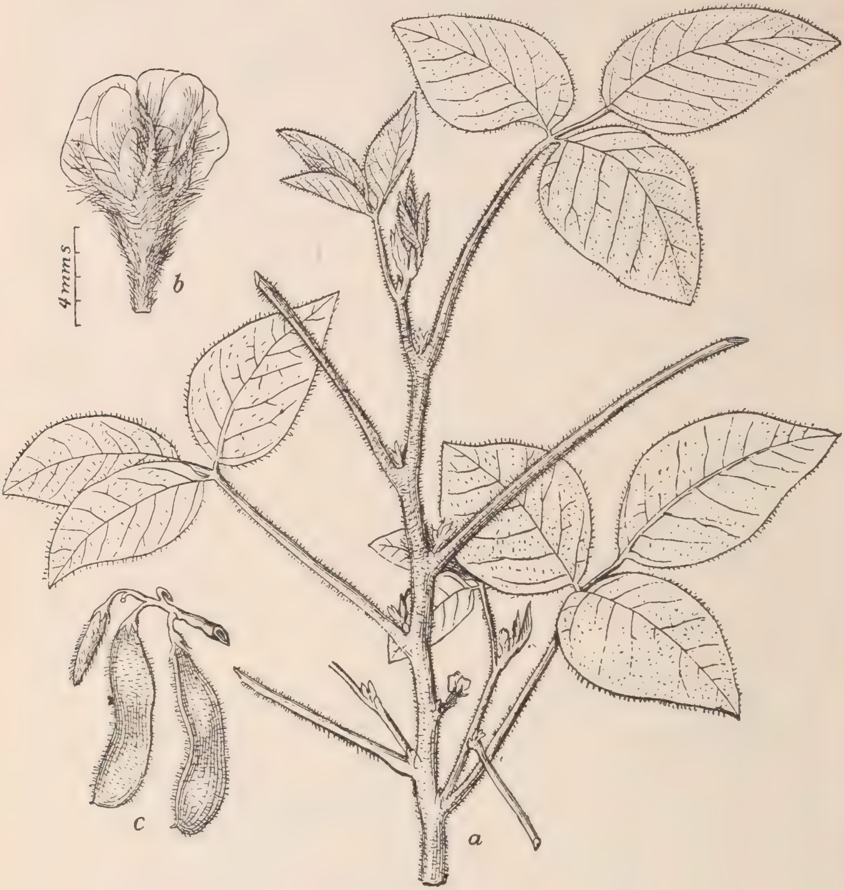


STARCH GRAINS OF ENTADA. ×400

Soy Bean—Food Value, etc.—Referring to his paper on the soja bean (see Proceedings 1896, 634), in which he gave a summary of the literature on this valuable food product, Prof. Henry Trimble reproduces in the abstract a recent paper entitled "The Soy Bean as a Forage Crop," by Thomas A. Williams, with an appendix on "Soy Beans as Food for Man," by C. F. Langworthy, published in "Farmer's Bulletin," No. 58, issued by the U. S. Department of Agriculture. While not adding anything new to the knowledge of the digestive ferment, which was prominently discussed in the summary above referred to, there is much valuable information that is of interest to the pharmacist. The name soja bean, which has previously been given to the bean of

Glycine hispida, Moench, is not correctly applied, the proper name being "soy bean," a name derived from the Japanese word "shoyu," denoting a preparation from the seeds, which is a favorite article of diet in Japan, and is popularly known under the name of "soy." The plant is an erect annual, with branching hairy stems, trifoliate, more or less hairy leaves, rather unconspicuous pale lilac or violet-colored flowers, and broad, two to five-seeded pods covered, like the stem, with stiff, reddish hairs. The accompanying cut (Fig. 77) shows at *a*, a flowering branch; at *b*, one of the flowers, and at *c*, some pods of the soy bean; the flower being enlarged, while the branch and pods are reduced two-thirds. The seeds vary in color from whitish and yellowish to green, brown and black, their color, size and shape, and the time when the plants reach maturity, determining the variations that are distinguished—such as "early white," "medium green," "late green," "medium black," etc. The shape of the seeds varies from spherical to elliptical, being more or less compressed. The plant, under favorable conditions, may reach a height of four feet or more, and, in Prof. Haberlandt's experiments in Austria-Hungary, has been known to yield as many as 200 pods with 450 seeds each. This shows the soy bean to be remarkably prolific, and from the fact that the flowers are self-

FIG. 77.



Glycine Hispida.

pollinated, this yield is entirely independent of insects, while an important obstacle in the way of its introduction into new regions does not obtain, as is the case with many other legumes. Naturally, the present paper discusses the subject mainly from the utility of the soy bean as a forage crop, and explicit information is given concerning the conditions of its growth, the chemical composition of forage made from it—fodder, hay, straw, the whole bean, bean-meal, ensilage, etc.—the feeding value of these various products, and the economic value of its cultivation as a soil renewer.

In the appendix the soy bean is considered in its character of a food for man. Comparatively little information is available concerning the chemical character of its different constituents. According to the Japanese investigators, the bean contains, on an average, 7.5 per cent. of nitrogen, 6.9 per cent being albuminoid nitrogen, exclusive of peptones, 0.1 per cent. amide nitrogen, and 0.3 per cent. nitrogen of peptones. The percentage of protein is thus evidently much higher than that found by Osborne in white or kidney beans (23.5 per cent.), and it is not improbable that it also differs materially in chemical character. Furthermore, the soy bean, according to Japanese authors, contains no starch. In order to make the nutrients of beans, and particularly of the soy bean, available, the beans must be cooked or prepared in some way so that the cell walls may be broken down and the contents readily acted on by the digestive juices. Though the soy bean is eaten more extensively in China and Japan than in any other countries, so far as can be learned it is never eaten there as a vegetable, but more or less complex food products are prepared from it, at least five preparations being commonly made in Japan, viz :—"natto," "tofu," "miso," which have been already described in Mr. Trimble's paper before referred to, and "yuta" and "shoyu."

Yuba. A sort of film forms on the surface of the soy-bean milk, which in appearance suggests cream. This material is sometimes prepared in quantity by evaporating the milk, and when dried it is used as an article of food under the name of yuba.

Shoyu is a sauce which, under the name of "soy sauce," has been known in India, and to some extent in Europe, for many years. It is prepared by subjecting a mixture of cooked and pulverized soy beans, roasted and pulverized wheat, wheat flour, salt, and water, to fermentation, with rice-wine ferment, in casks, for from one and a half to five years. The resulting product is a moderately thick brown liquid, and has an odor and taste not unlike a good quality of meat extract, though perhaps a trifle more pungent.

The statement is frequently made that the Japanese live almost exclusively by rice, eating little or no meat. It is not, however, generally known that the deficiency of protein in the rice is made up by the consumption of large quantities of shoyu, miso or other soy-bean products. It is stated on good authority that these products actually take the place of meat and other nitrogenous animal foods in the Japanese dietary. They are eaten in some form or other by rich or poor at almost every meal. In the following table the composition of each of the foods is given, together with that of a "miso" prepared in Switzerland, the manufacture of soy-bean products being attempted in Switzerland and elsewhere.

Soy-bean food products.	Water.	Protein.	Fat.	Nitrogen free Extract	Fiber.	Ash.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Fresh tofu	89.00	5.00	3.40	2.10	....	0.50
Fresh tofu	89.29	4.87	....	4.35	....	0.48
Frozen tofu	18.70	48.50	28.50	2.60	....	1.70
Natto	15.32	41.42	23.65	15.05	1.48	3.08
Yuba	21.85	42.60	24.62	7.65	....	2.82
White miso	50.70	5.70	24.40		12.60	6.60
Red miso	50.40	10.08	18.77		8.25	12.50
Swiss miso	12.53	26.43	13.91	19.54	1.41	26.18
Shoyu.	63.29	8.31	....	5.10	....	19.45
Shoyu.	67.42	7.37	....	4.06	....	17.47

Most of these foods are fermented; that is, they are prepared with the aid of special micro-organisms, and these micro-organisms have been studied in recent years. Under their influence the cell walls and other carbohydrate material are broken down and the cell-contents rendered more accessible to the digestive juices; at the same time peculiar and pleasant flavors are developed. The manufacture of these products is of very ancient origin, and affords an interesting practical illustration of the use of bacteria for economic purposes.—Am. Journ. Pharm., Nov. 1897, 584–593.

Peas and Lentils—Character of Proteid Constituents.—In a former paper, T. B. Osborne and G. F. Campbell had described legumin obtained from peas. They now find that this proteid as then obtained was contaminated with more or less vicilin, and that when the latter is completely separated, the legumin is identical in composition and reactions with that of the vetch. The pea is now shown to contain legumin, a globulin not coagulated by heating its solutions; vicilin, a globulin soluble in a more dilute brine than legumin and coagulated on heating its solutions to 95° to 100°; legumelin, a proteid partially precipitated by dialysis; a protoproteose and a deuteroproteose. The combined amounts of legumin and vicilin extracted was about 10 per cent., whilst the amount of legumelin was slightly more than 2 per cent. The lentil was found to contain the same proteids as the pea.—Journ. Am. Chem. Soc., 1898, 348.

Daviesia Latifolia—Isolation and Characters of a Crystalline Constituent.—J. Bosisto directs attention to an Australian plant, *daviesia latifolia*, which has the reputation among the residents in the districts in which the plant abounds of being, in the form of infusion, a successful remedy for hydatids, low fever, etc. The plant is described, together with numerous species of *daviesia*, by the late Baron von Muller in his "Fragmenta Phytographia." It abounds on lands of a light loamy and sandy character at the foot of the Dandenong Ranges, some twenty miles from Melbourne, and extends into the hilly districts of Gippo Land, Victoria. According to von Mueller, it is also found in parts of Tasmania and New South Wales, but not in South Australia or Queensland. Although a low-growing shrub, it is regarded by the selector of land as a weed, and being difficult of extermniation, the land, if possible, is avoided. The plant is locally known by a number of names, among which is "Native Hop Bush," not because of its resemblance to *humulus lupulus*, however, but possibly because of its bitter taste resembling that of the hop. This bitterness Mr. Bosisto thinks is due to a crystalline principle, which is isolated from the leaves and flowers with remarkable ease. He has forwarded a parcel of the plant—gathered during the flowering period, September and October,—to England, together with some of the crystalline principle, for examination. This

Crystalline Principle of daviesia latifolia was obtained by infusing the leaves and flowers in cold water, gradually increasing the temperature to 190° F., allowing the infusion to stand for two hours, straining and allowing to cool. The clear liquid is then filtered from the sediment, evaporated to one-half, and allowed to stand several days, during which crystals form on the surface and fall to the bottom. A further crop is obtained by concentrating the decanted liquid. The oleo-resin (*sic*) remaining will be found to have a bitter taste. The crystals, as received, were subjected to examination by Dr. B. H. Paul and A. J. Cownly, who obtained results which point out that it is either a glucoside or a substance of the nature of a plant sugar, though its persistent bitter taste, after recrystallization from water, is favorable testimony to its glucosidal character. By simple recrystallization from hot water, it was obtained in fine white needles, which were rendered anhydrous at 100° to 120° C. It readily dissolved in hot water and weak alcohol, and is soluble in chloroform, but insoluble in ether. It is soluble also in caustic soda, from which it is precipitated apparently unchanged by acids. The anhydrous crystals dried at 120° C., had the constant melting point of 146° C. Fusion with sodium gave no indication of nitrogen. Fehling's solution was not reduced until after hydrolysis with boiling acid.—Pharm. Journ., Feb. 26, 1898, 187–188.

Baptisia Tinctoria—Constituents of the Root.—In a previous paper Dr. K. Gorter had described the glucoside, *baptisin*, obtained from the root of *baptisia tinctoria*, the product of its hydrolization, *baptigenin*, the acid product, *styphnic acid (trinitro-resorcin)*, produced by the action of nitric acid upon the latter as well as upon the glycoside itself, &c., his results plainly indicating that baptigenin must be regarded as a body belonging to the aromatic series of compounds, containing a resorcin nucleus. This resorcin nucleus is also contained in the baptisin, since it also yields by nitration styphnic acid in considerable quantities. The author now finds that by the action of melting potassa, under conditions which are described, *pyrocatechin*, *resorcin* and *formic acid* are produced. By the action of potassium permanganate upon baptigenin, he obtained an aromatic crystalline body, having the odor of *piperonal* and apparently identical with this body. By prolonged boiling with 5 per cent. solution of caustic soda, both baptigenin and baptisin yielded a new body, which the author has named

Baptigenetin.—It has the composition $C_{12}H_{10}O_4$, crystallizes from dilute alcohol in colorless silvery-glistening leaflets, which melt at 148° C., and are very sparingly soluble in cold water, and cold dilute alcohol, but readily soluble in hot dilute alcohol, in 95 per cent. alcohol, in chloroform, ether, and glacial acetic acid. It is insoluble in carbon disulphide, while it dissolves with comparative ease in hot ligroin and in hot benzene, crystallizing out completely on cooling its solution in ligroin. Its alcoholic solution has a faint acid reaction, and is colored intensely red by ferric chloride; sulphuric acid produces a dirty olive green color passing to violet, but if it contains a trace of sulphuric acid, an intense red-brown color is produced.

The author has also experimented to determine the *physiological action of baptisin*, and found that when administered to frogs in quantities up to 50 milligrams subcutaneously, the results are absolutely negative. It must, therefore, be regarded as completely non-poisonous in its action upon frogs. The alkaloid

Baptitoxine was also prepared by the author by a process which is given in some detail, and it is described together with the nitrate, hydrochloride and aurochloride. It is evident from these investigations that the alkaloid of the root of *baptisia tinctoria* is identical with *cytisine*, $C_{11}H_{14}N_2O$.; the *identity of baptitoxin with cytisine* being further confirmed by its physiological action upon frogs, which was absolutely the same with both bases.—Arch. d. Pharm., 235, No. 5 (July, 1897), 321–332.

Horseradish Tree—Its Uses and Repute as a Medicine.—Norman S. Rudolf describes the horseradish tree of India as being one of the most beautiful plants of the jungles. To botany it is known as

Moringa Pterygosperma, but is known by various names in India: Bengali—*sojna;* Hindustani—*shajni;* Bombay—*sakata.* Indigenous to the lower slopes of the Himalayas, it is cultivated in the gardens of Bengal, Bombay, Burmah, and other districts having a warm and moist climate. All parts of the tree are used for culinary purposes. The unripe, green capsules, the leaves and the flowers are found in most bazaars, as they are common ingredients in curries and other dishes. The tender young roots are used in many parts of India as a substitute for horseradish (*cochlearia armoarcia*), which they resemble very closely in flavor and appearance. Though not employed to any extent in modern Indian medicine, great importance was attached to the different products of the tree by the ancient Hindu medical authorities, who employed the fresh juices of the leaves as an emetic; the leaves boiled in water as poultices; the flowers, pounded with butter, as a powerful tonic; and the scraped bark of the tree as poultice, and internally in the treatment of jaundice and as an aphrodisiac. The fruit, besides being used in the preparation of curry, is recommended as an article of diet to those suffering from enlarged liver. A clear yellow gum exudes from the trunk, which swells greatly when moistened, and has on account of this property been used to induce abortion by applying it as a tent to dilate the os uteri. Finally, the seeds yield a clear, light-colored fixed oil, which is largely used in the extraction of perfumes from flowers.—Bull. Pharm., Aug., 1897, 343.

Nekoe—An East Indian Fish Poison.—According to J. F. Pool, the natives of India designate by the name *nekoe* the stalks of a papilionaceous plant,

Louchocarpus violaceus, Rth., growing in Surinam. The plant has a disagreeable ammoniacal odor, wherefore it is also called *tiengi hoedoe*, stink-wood. The natives carry on fishing in the following manner: A bay being enclosed by a dam, they strike the water with the wood. After a time the fish come to the surface unconscious. The active constituent of *nekoe* is probably identical with the *derrid* of *derrisecliptica* and with other substances going under different names, which are found in several of the *papilionaceæ* (*theophrasia*, *piscidia*, etc.) For its preparation, *nekoe* is first digested with alcohol, this alcoholic solution precipitated with water, and the crude precipitated product freed from resinous substances by boiling with soda and dilute solutions of sodium hydroxide. It crystallizes from absolute alcohol in delicate scales which have an acrid taste, are free from nitrogen, insoluble in cold water, but soluble in almost all other solvents. The symptoms of poisoning consist first of narcosis or numbness, accompanied by difficulty in breathing and vomiting. In course of half an hour death sets in. Dissection showed strong congestion of the blood in all organs, and ecchymosis in the lungs and kidneys. —Pharm. Review, April, 1898, 148, from Nederl. Tijdschr. Pharm. 10, 18, from Chem. Centralbl. 69, 520.

Chinese Soap Tree—Reference to Gymnocladus.—Referring to a recent article in "Meehan's Monthly" (Sept., 1896, 180), in which the "Chinese Soap Tree" is referred to *gleditschia chinensis*, Augustine Henry, of Mengtse, China, calls attention to the fact that the reference is incorrect. It should be *gymnocladus* instead. In this connection he calls attention to the American species, *gymnocladus dioica*, Koch, which is popularly known as the Kentucky coffee tree, because it is reputed that its seeds were used by the early settlers in that State as a substitute for coffee. This seems very remarkable, considering that the Chinese species has seeds full of saponin, which render them, of course, unfit for human consumption. The bark of the American tree, it is said, contains saponin; and it would be of interest to know for certain if the seeds are really devoid of that substance, and if they were actually used as food. The occurrence in such widely distant areas as China and the United States of small genera characterized by two, or, at most, three or four species, confined to these regions and divided between them, is a very remarkable phenomenon, and deserves to be treated afresh, in view of the many discoveries of new plants in China during the last ten years.—Amer. Drugg., Jan. 25, 1898, 35.

Retama Sphærocarpa — Isolation and Character of an Alkaloid "Retamine," which see under "Organic Chemistry."

Penthaclethra Macrophylla—Alkaloidal Constituent of the Seeds—A writer in "Pharm. Zeit. f. Russ" (xxxvi. 295), describes an alkaloid from the seed of *Penthaclethra macrophylla*—a plant growing in the Congo States—which he has named

Paucine.—To obtain it the alcoholic extract is treated with petroleum ether to remove oil and other objectionable components, and the residue is then treated with dilute acid, from which the alkaloid may be liberated by an alkali. Paucine crystallizes in yellow foliaceous crystals, which are soluble in soda solution, insoluble in ether or chloroform, and have a composition corresponding to the formula $C_{27}H_{39}N_5O_5$. At 126° C. the alkaloid melts and decomposes.—Pharm. Jour., Aug. 28, 1897, 190.

Oil Tree "Gum"—Chemical Examination.—Charles W. Dirmitt has subjected "oil tree gum," a substance obtained by tapping the trunk of a West Indian tree,

Priori copaifera, to chemical examination. This substance had previously been described by Mr. William Faucett in the *Bulletin of the Botanical Department*, Jamaica (Vol. IV.), who gave the results of an examination made by Prof. Henry Trimble. According to this, it is a thick, adhesive liquid, resembling copaiba in appearance, separating on standing into two layers, but becoming turbid when thoroughly mixed from presence of a greenish substance held in suspension. In thin layers it is transparent, and of a pale straw-yellow color. It is without pronounced odor, but has a fatty taste, which subsequently becomes acid. It is incompletely soluble in alcohol of sp. gr. 0.820, but readily and completely soluble in absolute alcohol, ether, chloroform, carbon disulphide, petroleum ether, amyl-, ethyl- and methyl-acetates, amyl alcohol, benzene, toluene, nitrobenzene, aniline, acetone, phenol, oil of turpentine, cotton-seed oil (fixed oils ?), glacial acetic acid and oil of camphor. Its behavior when subjected to heat indicated that this so-called "gum" has some relation to fixed oils, and this is now further confirmed by the chemical investigations of Mr. Dirmitt, which are given in the present paper in some detail, and point out that there exists some relation between this substance and the higher fatty acids or fats, although the empirical formula found by combustion does not coincide with the general formula of the acids of either the paraffin, olefine, or acetylene series.—Amer. Jour. Pharm., Jan., 1898, 10–18.

TEREBINTHACEAE.

Rhus Toxicodendron and R. Venenata—Active Constituent.—Dr. Franz Pfaff, not being satisfied with the results of previous experiments upon the irritant poison contained in *rhus* species, has made a thorough examination of *rhus toxicodendron* and *rhus venenata*, which convinced him that the active constituent is not of a volatile but of a fixed nature. Upon distilling the alcoholic extracts obtained from these two plants, a black, oily residue was left, which, after being purified, gave an agreeably odorous oil, for which he proposes the name

Toxicodendrol.—It is readily soluble in alcohol, ether, benzol, chloroform, etc., but insoluble in water. It is easily decomposed by heat, but only slowly at ordinary temperature, and on prolonged exposure to air it is changed to a resin. There can be no doubt that *toxicodendrol* is the active principle, as the effect of its application in very small quantities upon several assistants and upon others was to produce typical cases of rhus poisoning. There is a popular theory or impression that a volatile or poison emanates from the rhus which acts upon sensitive people even at distance and without contact with the plant itself. Dr. Pfaff and his assistants could detect no such sign, and account for all cases of rhus poisoning by direct contact with the plant, or by contact with some object which the plant has touched and upon which the viscid oil is left. He also suggests that in time of anthesis the flying pollen may communicate the trouble. *Toxicodendrol* is present in all parts of the plant, whether in a fresh, green state, or in old and dried specimens. The *rhus venenata* yields a larger percentage of oil than the *r. toxicodendron*, but no difference has been found between the oils of the two species. As a practical result of his investigation, Dr. Pfaff shows that the best remedy in all stages is a copious application of soap, water, and scrubbing-brush, which thoroughly removes the irritant; while, on the other hand, an application of oils, vaselin, or alcohol, unless removed at once, only serves to spread the poison, as it is readily soluble in these substances.—Bull. Pharm., Dec., 1897, 556; from Journ. Exp. Med.

Bisabol Myrrh—Proximate Examination.—Tucholka has subjected bisabol myrrh to proximate analysis with the following result: gum soluble in water, 22.1; gum soluble in soda solution, 29.85; resin, 21.5; bitter principle, 1.5; volatile oil, 7.8; water, 3.17; vegetable and inorganic matter, 13.4. The *red volatile oil*, when treated by a modification of Wallach's method for the preparation of the hydrochloride of the terpenes, yielded small, well-formed, tablet-shaped crystals, melting at 79.3° C., which he is unable to identify with any known terpene, and for which he proposes the name *bisabolene*. It has the unusual high boiling point of 260° C. The oil undoubtedly also contains alcoholic, ester-like compounds, since benzoyl chloride reacts very violently with it on gently heating. The *resin*, which is removed by alcohol and has a strong acid reaction, is composed of two distinct acids, the one forming soluble and the other insoluble lead salts. To distinguish between this variety of myrrh and the official myrrh, the author recommends the following color reaction, which seems to be peculiar to a fraction of the oil obtained between 230° and 239° C.: To six drops of a petroleum ether extract, prepared of the strength of 1 : 15, 3 Cc. of acetic acid and 3 Cc. of sulphuric acid are added, so that the latter shall form a distinct lower layer. A rose-red color is developed at the point of contact, and soon the whole of the acetic acid layer is colored red, and remains so for some time. Both the oil and the fraction mentioned produce this reaction. The official myrrh treated in the same way gives at first a green color, which changes, on standing, to brown, with a greenish fluorescence, while the acetic acid only acquires a slight rose coloration.—Pharm. Centralh., *38*, 500.

Schinus Molle—Characters of the Volatile Oil of the Fruit.—Gildemeister and Stephan have made experiments upon the volatile oil from the fruit of *schinus molle*, and have obtained results which differ in some respects from those obtained by Spica in 1884. The fruit yielded by distillation 5.2 per cent. of a thin oil of specific gravity 0.8505, with rotatory power + 46.7° at 17°. It dissolved in about 3.3 parts of 90 per cent. alcohol, and gave an intense phellandrene reaction. Further examination showed that the greater part of the oil consists of phellandrene—much dextro- and little lævo-phellandrene—a small quantity of carvacrol, and possibly traces of pinene.—Arch. d. Pharm., 1897 (*235*), 582.

Sicilian Sumach (*Rhus Coriaria*).—Adulterants and their *Yellow Coloring Matters*, which see under "Organic Chemistry."

PIPERACEÆ.

Matico—Commercial Variation.—G. Dethan and R. Bertant point out that the matico of commerce contains the leaves of two varieties of *piper angustifolium*, which differ somewhat in shape. These are present in herbaria under the names of variety *α cordulatum* (*artanthe elongata*, Miq.), and variety *β ossanum*, which correspond to the *piper angustifolium* of Ruiz and Pavon. The former has the leaves larger, shorter, and broader in proportion, and obliquely cordate at the base. There are, also, in the anatomical structure, differences by which the two varieties can be recognized. The midrib of *α cordulatum* is much less convex below than in the variety *β ossanum*. The fibro-vascular bundles form a shallow arc and not a circle, and no stone cells are visible. Where the secondary nerves join the midrib there is a special cavity containing hairs and stomata. Such cavities are formed by the growing together of the nerves, owing to hypertrophy of the tissue, which separates them.—Pharm. Journ., Jan. 8, 1898, 25; from Journ. de Pharm. et de Chimie [6], vi., 537.

RHAMNACEÆ.

Frangula Bark—Constituents.—Kubly, in addition to emodin, frangulin and chrysophan, all definite crystalline chemical bodies known to exist in the bark of *rhamnus frangula*, had isolated a crude acid which on purification yielded pure frangulic acid, a glucoside. Dr. E. Aweng, by his recent experiments, now adds other bodies. He regards the so-called pure frangulic acid of Kubly as a decomposition product, and terms it pseudo-frangulin; the original crude acid of Kubly he calls "primary glucoside." When hydrolyzed, pseudo frangulin furnishes pseudo-emodin. Both these are slightly aperient. The emetic action of the green bark is attributed to a hydrolytic ferment, which is destroyed by heating. In preparing the fluid extract of *rhamnus frangula* the author suggests that the glucosides should first be hydrolyzed by heating with citric acid solution, evaporating to dryness, and then extracting with alcohol 96 per cent. The citric acid may if desired be removed—Pharm. Journ., Jan. 8, 1898, 24; from Journ. der Pharm. v. Els.-Lothr., 1897, 183.

Cascara Sagrada—Review of Previous Experiments.—Luther F. Stevens presented a paper at the meeting of the N. Y. State Pharmaceutical Association, in which he reviews the literature on the subject of cascara sagrada down to a recent date, mentioning the salient points developed in the different investigations that have been made. He concludes his paper, which may be profitably consulted, with a recommendation of diluted alcohol in conjunction with calcined magnesia for the preparation of a pleasant extract, and reproduces the formula originally proposed by Frank Edel on these lines for the preparation of a bitterless extract of cascara.—Proc. N. Y. State Pharm. Assoc., 1897, 246–249.

Cascara Bark—Varieties of Lichens Found on It, which see under *Lichens.*

EUPHORBIACEÆ.

Castor Oil Plants—Constituents of the Germinating Shoots.—E. Schulze has isolated glutamin, $C_5H_{10}N_2O_3$, from the etiolated germinating shoots of castor oil plant, and also a new nitrogenous body, which he calls

Ricidin, and to which the formula $C_{12}H_{13}N_2O_3$ is given. It crystallizes in small colorless prisms, melting at 193° C, and is present to the extent of 3.5 per cent. in the cotyledons, and a little over 1 per cent. in the hypocotyl and the root.—Pharm. Journ., Feb. 26, 1898, 185; from Berichte, xxx, 2197.

Croton Tiglium—Historical, Botanical and Pharmacological Study.—

Prof. John Uri Lloyd contributes a monograph on *croton tiglium* in which he gives an historical sketch of the plant and its products in chronological sequence from the date of the first account of certain products of the plant in European literature, given by Christoval Acosta in 1578, who described the wood as "lignum pavanæ," and the seed as "pini nuclei moluccani." A botanical description of the plant, illustrated by drawings showing its more important organs, is also given, together with the synonyms (8) under which the plant has at different periods been referred to. The chemical constituents of the seed and of the oil prepared from them are also discussed, together with the pharmacological uses of the oil. A bibliography of 16 references closes the paper.—West Drugg., April, 1898, 151–154.

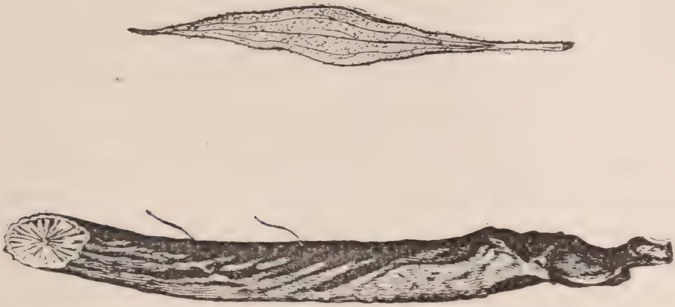
Cascarilla Bark—Alkaloidal Constituents.—The observation of Boehm that cascarilla bark contains an alkaloid closely allied to choline (see Proceedings 1886, 465) has been the incentive to W. A. H. Naylor for a re-examination of that bark, the results of which he now communicates. By a process, which he describes in detail, he obtained the platinum compound of a base, which crystallized from hot water in dark yellow hexagonal plates, and from weak alcohol in octahedral form. By treatment of the solution of this compound with sulphuretted hydrogen, filtering the solution, evaporation to dryness, and purification by repeated crystallization from warm water, a white, minutely crystalline chloride of the base was obtained. This chloride, when perfectly dry, was practically insoluble in alcohol, and when heated it melted with intumescence, and gave off trimethylamine, the latter indicating its analogy to choline. But its insolubility, its melting with intumescence, and the fact that its platinum salt yields a mean of 30.16 per cent. of Pt, prove beyond doubt that the base in question is not choline, which requires theoretically 31.65 per cent. Pt, but *betaine*, which requires 30.28 per cent. of platinum.

In a chloroformic residue obtained in the course of his investigations he found a second alkaloid, which, though not obtained in an absolutely colorless condition, he recognizes as being *cascarilline*. The same alkaloidal substance was also obtained from the impure cascarilline yielded by Alessandri's process, and the author is convinced that the existence of a base in cascarilla bark, other than one allied to choline, which has heretofore been a debatable point, may now be accepted as a fact.—Pharm. Journ., March 19, 1898, 279.

Echinacea Root—Characters and Constituents.—Prof. J. U. Lloyd calls attention to "echinacea root" which appears to enjoy a reputation as a cure-all in some localities in Nebraska. The plant yielding the drug has been identified as being

Echinacea Angustifolia, D. C. The root, which is shown in the accompanying cut (Fig. 78) together with a leaf of the plant, has a brown or brown-red color. It is much wrinkled longitudinally, and the folds of the shrunken epidermis often twist about the root in spiral form. When sliced transversely, the yellowish medullary rays are seen to be separated from each other by a greenish pulp, and when the dried root is broken the fracture presents the appearance of having been afflicted with dry rot. Upon chewing some of the root of prime quality, a sweetish taste manifests itself primarily, and on prolonged chewing becomes acrid and tingling, reminding of aconite, but devoid of the benumbing quality of the latter. Insipid and worthless lots have been found by the author, and there will doubtless be great variations found. Echinacea root contains minute amounts of a colorless alkaloid, which, however, does not constitute the active constituent. It contains sugar and large amounts of coloring matters which prove injurious if allowed to remain in its preparation. The important constituent is a colorless substance of acid reaction. This is intensely acrid and persistent, distressingly so in a pure condition, and exists in amounts of less than one-half of one per cent. Prof. King has become a strong advocate of the virtues of the drug, preparations of which have become well established in eclectic practice since its introduction in 1885.—Pharm. Review, Oct. 1897, 206.

Fig. 78.



Echinacea Angustifolia.

Echinacea Root—Varieties and Proximate Constituents.—Prof. L. E. Sayre describes two species of *echinacea—e. angustifolia* and *e. purpurea,* both of which are found growing in Kansas. It is the root of *e. angustifolia* which is in demand as a medicine, although it is a question whether the *purpurea* root does not possess similar properties. Both plants are shown in flower and leaf, as is also a magnified cross-section of the root of the *angustifolia* species. The commercial drug—the root of *e. angustifolia*—was subjected to proximate examination by Mr. S. R. Boyce, and subsequently, following up Mr. Boyce's suggestions, by Mr. Kirkland, who obtained the following results by Dragendorff's method:

Chloroform extract, 1.353 per cent.; petroleum ether extract, 1.32 per cent.; benzene extract, 2.085 per cent. (of which soluble in alcohol, 87.66

per cent.); ether extract, 2.12 per cent. (of which soluble in water, 18.95 per cent; in alcohol, 57.86 per cent.); alcoholic extract, 12.078 per cent. (composed of resin, 9.78 per cent.; vegetable acids, 38.62 per cent.; coloring matters, 51.58 per cent.); aqueous extract, 9.744 per cent. (composed of gum, 32.33 per cent.; carbohydrate, 18.95 per cent., undetermined, 51.28 per cent.); soda extract, 20.026 per cent. (containing 13.36 per cent. albuminoids). The ash amounted to 5.93 per cent. Other experiments made appear to indicate the presence of an alkaloid. By treatment of a portion of the drug with carbon disulphide, under conditions given in some detail, a crystalline mass was obtained, which had an odor and taste characteristic of the drug. It is believed that the active principle or principles are contained in this mass, which requires further examination. —Drugg. Circ., June, 1898, 124.

Stillingia Root—Microscopical Examination.—Prof. L. E. Sayre describes the structural characteristics of stillingia root as follows: In sections of roots, about 1 Cm. in diameter, the woody center occupies about half the diameter of the root. Around this is disposed the thick bark, containing numerous bast fibres, separately imbedded in parenchyma, and yellow resin cells. In longitudinal section, the long bast fibres are clearly seen stretching through the mass of thin-walled parenchyma cells. The woody center, however, exhibits the most striking and characteristic structure. The elements are here distributed in very distinctly radiating lines. The cells are thin walled and appear somewhat elongated in longitudinal section. At the center they are closely pressed together and have their walls thickened. Through this woody center run numerous tracheids, arranged in four or five radiating rows, that are quite regular in their disposition. In longitudinal section these ducts are seen to be pitted. The cambium line is found to be composed of distinctly marked flat cells. Throughout the root considerable starch is found. The granules are, in general, of a rounded form, with a distinct hilum, eccentrically placed and frequently branched.—Drugg. Circ., Jan., 1898, 5.

Omphalea Megacarpa, Hemsl.—Presence of a Bland Purgative Oil in the Seed.—J. H. Hart directs attention to the beautiful, bland, tasteless and efficiently purgative oil that has been obtained from the seeds of *Omphalea megacarpa*, Hemsl., by Prof. Calmody, the government chemist in Trinidad. Half the oil contained in a single seed is a brisk purgative, acting in about three hours, and not causing pain, and the action is of short duration. The seed is described as follows: The shell of the seed is hard, rough, black, and somewhat brittle, whilst the interior is edible and of sweet, nutty flavor, without any prominent characteristic. The fruit in which they are contained is some 3½ inches in diameter, and has a glabrous outside skin, which is a quarter to three-eighths of an inch in thickness, and somewhat pulpy and fibrous. Surrounding the seeds there is found a thin parchment covering, but this is partly aborted. Beneath this is a large quantity of starchy tissue, three-eighths of an inch in thickness. The seed alone weighed only 13.150 grammes, but the starchy pulp surrounding a seed of medium size weighed 31.175 grammes, fully 50 per cent. of which was found to be pure starch, having peculiarly irregular, partly triquetrous, and partly spherical grains, which adhere together in the first instance in masses of 10 to 20 grains, the triquetrous and irregular side inwards, and the rounded side outwards. The nuts are said to be eaten in the woods by travelers and hunters, and are hence known as the "Hunterman's nut." Unless the purgative principle can be driven off bv heat, it seems more probable that the starchy part (? arillus) would be the edible portion. The seed is without any disagreeable flavor, but has a sweetish taste like an ordinary nut. So prompt and agreeable a purgative, causing no pain and acting for a short time only, seems worthy of attention.—Pharm. Journ., Feb. 26, 1898, 184.

Aleurites Cordata, Stend.—The Wood Oil Tree of China.—Augustine Henry, of Mengtze, China, in view of the interest that has some time been taken by the U. S. Consuls in gathering information concerning "Wood Oil," gives some interesting information in regard to this product. He says that the tung-yu of the Chinese is invariably known to English-speaking people in the East as *wood oil;* and there is not the slightest doubt in regard to its botanical origin. It is expressed from the seeds of the tree now known to botanists as *aleurites Cordata, Stend.* This tree rejoices in about a dozen synonyms, of which *elaeococca cordata, Blume*, and *dryandra cordata, Thunb.*, are the most noteworthy. The wood-oil tree is known as the *tung-tze*, *yu-tung*, or *ying-tze-tung*, and need never be confused with any of the other trees just mentioned. Its product, the wood oil, is a peculiar oil, *sui generis*, which is scarcely ever used for lighting, but is universally employed in China for varnishing wood-work, which it preserves in a marvelous way. The myriad fleets of native craft on the inland waters of China are always varnished with this oil, their wood work never receiving a touch of paint. The poisonous nature of the oil might be utilized in compositions used on ships' bottoms to prevent marine growths; at any rate, experiments in this direction might be made. The wood oil, mixed with lime, forms chunam, extensively used in calking. While the oil is poisonous when taken internally, it has no irritating effect, so far as the author is aware, on the skin. The Hankow report, in speaking of its poisonous quality, confuses the wood oil with a totally different product, namely, varnish or lacquer, obtained from *rhus vernicifera, D. C.*, which, like other sumachs, often gives rise to intractable sores. The author expresses the opinion that there should be no difficulty in introducing this tree into cultivation in the United States. The wood oil tree grows freely and spontaneously in the barren, rocky mountains of Hupeh at elevations of from 500 to 4,000 feet above sea-level, and where there is an annual range of temperature from 32 to 100 degrees Fahr. In Hainan and Formosa it bears a tropical climate The tree is ornamental, besides being useful, and it might be tried in rocky, barren soils in the southern and central sections of the United States.—Amer. Drugg., Jan. 25, 1898, 33.

Referring to the preceding article, V. K. Chestnut, of the U. S. Department of Agriculture, observes that, while Dr. Henry's statements concerning wood-oil are in the main correct, he is inclined to believe that in common with other euphorbiaceæ, its reputation as a skin irritant, as mentioned in a consular report, is well founded. As to its introduction into this country, it seems to him questionable whether the oil can be produced abundantly enough in the United States to compete with the Chinese production. They have the advantage of an enormous production in a native climate and also cheap labor. We cannot easily contend against such elements, even if it were assured that the oil has all of the good properties claimed for it. If you could have this fact demonstrated in some way, it would be a decided step in the solution of the question.—Ibid., 35.

Japanese Wood-Oil—Characters and Product of Heating.—Jenkins has examined a sample of Japanese wood-oil, which is expressed in China and Japan in very large quantities from the seeds of *aleurites cordata*, and is used there chiefly as a varnish and for lighting. The sample was clear, had a golden-yellow color, was very viscous, and possessed remarkable drying properties. Its sp. gr. was 0.9385; solidifying point, below —17° C.; iodine value (Hübl), 165.7; saponification value (Mgm. KHO), 194; Hehner value, insoluble fatty acids, 96.4 per cent.; unsaponifiable matter, 0.44 per cent.; specific temperature reaction, 372°; free fatty acid, calculated as oleic, 3.84 per cent.; melting point of mixed fatty acids, 37° C.; solidifying point of same, 34° C.; iodine value (Hübl) of same, 150.1.

Some of the oil was heated strictly out of contact with air, first for an hour at 150° C., then for two hours at 200° C., and lastly for two hours at 250° C. At temperatures above 180° C. a very small quantity of gas was given off, but no change in the liquid condition of the oil was noticed until after the last heating to 250° C., when it became converted into a clear, solid, elastic substance. This peculiar product was insoluble in the ordinary oil solvents, and showed no tendency to melt on being heated again up to the temperature of its formation.

Japanese wood oil has heretofore been examined by Cloez, about 20 years ago, and more recently by Davies and Holmes.—Pharm. Journ., Oct. 23, 1897, 361, from Journ. Soc. Chem. Ind. xvi, 195.

URTICACEÆ.

Hemp Seed—Proximate Examination.—Orba Wherrell, after calling attention to the large number of plants—some eighteen or more—which in different parts of the world are designated as hemp, gives some interesting information concerning the seed of *cannabis sativa*, and the fixed oil obtainable from it. Although hemp-seed oil has been reported as being largely used in this country as an adulterant of linseed oil, none can be found on sale in the United States, and the report is evidently false. The per cent. of oil contained in the seed varies according to the different specimens of seeds used. Analysis of two samples furnishes the following results :

Oil	33.6	35.65
Organic matter	23.6	51.31
Nitrogenous matter	16.3	
Lignin	12.1	
Mineral substances	2.2	7.39
Water	12.2	5.65
	100.0	100.0

"Hemp-seed oil," when first expressed, is of a greenish-yellow color, but becomes yellow with age. It has a disagreeable odor and a sickening taste. It thickens at 5° F., and concretes at 17.5° F. below zero. Its density equals 0.9252 at 60° F. Beyot in 1860 obtained 28 per cent. of fixed oil from hemp-seed ; Cloez in 1865 obtained 31.5 per cent. ; and Munch in 1866 obtained 35.5 per cent.—Bull. Pharm., Aug., 1897, 340.

Persian Hashish—Preparation.—According to Bonati, hashish is prepared in Persia by rolling the flower stalks and leaves of the hemp for hours vigorously on rough woolen carpets, when the viscid sap adheres to the pile on the carpet ; it is scraped off with a knife and rolled into balls or sticks. A less valuable preparation is obtained as a by-product by washing the carpets with water, and evaporating the washings by exposure to the sun on china plates. The author also speaks of an

Oil of Cannabis Indica as being a very strong narcotic, a very small dose being sufficient to send a large number of people to sleep for 24 to 72 hours. It is frequently used for criminal purposes. The hashish is smoked in a pipe in doses of 0.24 to 1.2 Gm.—Pharm. Jour., May 28, 1898, 505 ; from Jour. d. Pharm. v. Els. Lother., 1898, 25.

Carica Papaya—Investigation of the Constituents of the Leaves.—J. J. L. van Rijn has continued his studies upon the nature and constitution of

Carpaine, the alkaloidal constituent of the leaves of *carica papaya*. Having been supplied with a quantity of the pure substance by E. Merck, he subjected some of it to the prolonged action of boiling 1 per cent. alcoholic hydrochloric acid. Though the greater portion of the carpaine was again obtained in an unchanged condition, a small quantity of a new base was also obtained. The new base formed felty, silky-glistening needles, and was distinguished from carpaine by its lower melting point and by its ready solubility in water. By prolonged action of boiling baryta water upon carpaine, alkaline vapors are given off, and the residual solution yielded to ether an acid compound which is apparently crystallizable. The products of the oxidation of carpaine by potassium permanganate in acid solution, consist of several crystallizable acids, which differ in their melting point, but are all free from nitrogen. Their quantity was too small for nearer identification. The residual liquor, from which these acids had been shaken out by ether, yielded a neutral crystalline substance, containing nitrogen, and presumably the potassium salts of an acid containing nitrogen. The author also describes a new glucoside,

Carposid, which he has isolated from the liquors from which the carpaine had been shaken out (by the manufacturer ? Rep.) with ether. The new glucoside possesses none of the characters of saponin—heretofore designated as one of the constituents of pawpaw leaves. It was obtained in form of a white mass, composed of hygroscopic needle-shaped crystals, soluble in water and in alcohol, but insoluble in ether. The author's paper is concluded by a crystallographic description, by Prof. A. Wichmann, of carpaine and some of its salts, viz., the hydrochloride, the acetate, the sulphate, the nitrate, the picrate, and the precipitate obtained by iod-iodide of potassium from solutions of the hydrochloride; the crystalline distinction and characteristic being shown in cuts accompanying the paper.—Arch. d. Pharm., No. 5 (July 22), 1897, 332–342.

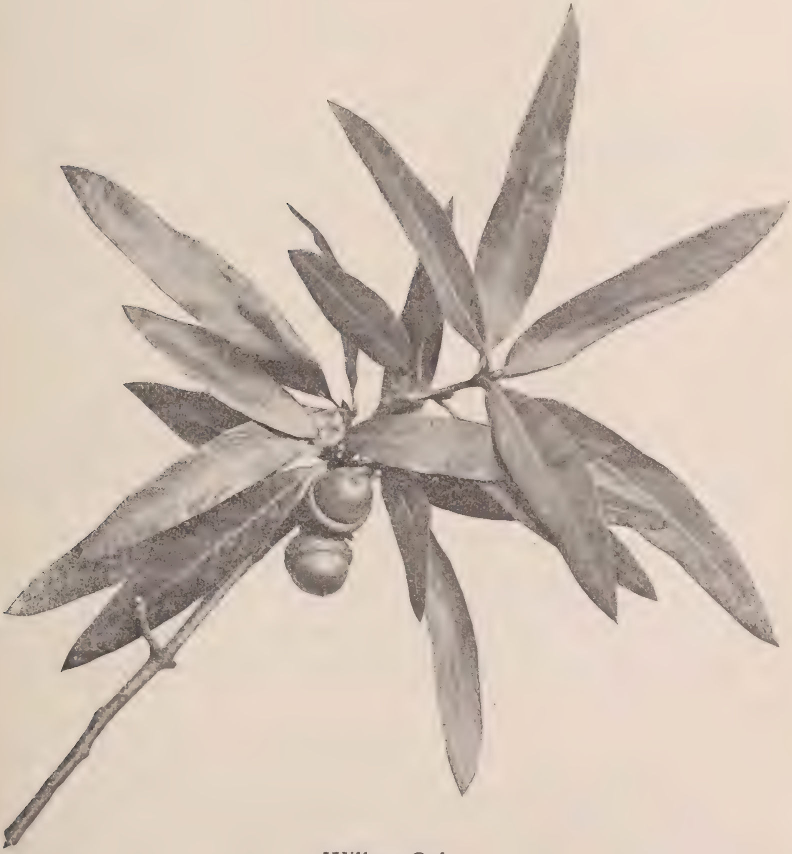
BETULINEÆ.

Birch Leaves—Diuretic Properties.—Moreau confirms the observations of Winternitz and of Huchard that birch leaves possess decided diuretic action when given in form of decoction or extract. He finds, furthermore, that the diuretic effect of the decoction is very sensibly increased if during the extraction of the leaves a little sodium bicarbonate is added. This effects the solution of the resinous acid isolated by Kossman, and named by him "betulorentinic acid," which in all probability is the diuretic principle of the leaves. To make the decoction, 10 to 50 grammes of birch leaves are boiled with a liter of water, adding 1 grain of sodium bicarbonate when the temperature of 30° or 40° C. is reached. An extract of the leaves, prepared by repeatedly macerating them in an equal weight of alcohol, expressing and evaporating the united extractions after recovery of the alcohol to the proper consistence, is also effective. It may be given in daily doses of from 1.6 to 2.4 grammes, divided in pills of 0.2 gramme each. The diuretic action of the medicine is occasionally attended by a laxative effect.—Pharm. Centralh., Feb. 3, 1898; from Rép. de Pharm., 1898, 24.

CUPULIFERÆ.

Willow Oak—Habitat, Description, etc.—Prof. Henry Trimble calls attention to the willow oak, *quercus thellos*, L., which is common in the neighborhood of Philadelphia, but is found along the coast of the Eastern United States from Long Island to Florida, and thence westward to Missouri and Texas. It prefers low, moist ground, and in the latitude of Philadelphia is rather a small tree, rarely exceeding in height 40 to 50 feet; but further south, it attains a maximum of 80 feet and a diameter of 3 feet. The accompanying illustration (Fig. 79), shows the peculiar character of the foliage of the willow oak, which has so close a resemblance to that of a willow tree, that the casual observer, if he did not notice the tiny acorns, would so pronounce it. It has, therefore, always been regarded with curiosity, and appears to have been especially so regarded in London over a century ago, to judge from the correspondence of Peter Collinson and John Bartram. Investigations concerning the composition of the bark of the willow oak are now in progress. The tree does not appear to possess any marked economic value, though Dr. Charles Mohr describes the wood as being hard, very elastic, compact, and suitable for railway carriages and many other purposes.—Amer. Jour. Pharm., Dec. 1897, 617–618.

FIG. 79.



Willow Oak.

Castanopsis Barks—Tannin Content.—Henry Trimble has determined the tannin in the bark of several species of *castanopsis* received from Dr. H. N. Ridley, of the Singapore Botanical Gardens, the barks having been mentioned by him in a previous paper as containing strontium (see Proceedings 1897). He has also determined the tannin in two samples of bark from the American species, *castanopsis chrysophylla*, as well as that in the barks of two Indian species of *quercus*—*q. hystrix* and *q. discocarpa*—and that in the bark of the American species, *quercus densiflora*. The results are shown in the following table:

Source of Bark.	Moisture.	Ash in absolutely dry samples.	Tannin in absolutely dry samples.
Castanopsis wallichiana	8.94	4.40	5.37
" curtisii, old tree, Penang	8.53	2.03	16.07
" " young tree, Singapore	6.81	4.41	7.21
" Javanica	6.93	4.61	8.06
" Hullettii	6.51	3.77	6.73
Quercus hystrix	7.00	6.20	8.60
" discocarpa	7.27	3.93	5.28
Castanopsis chrysophylla	42.72	3.70	18.92
" "	10.43	0.61	8.58
Quercus densiflora	10.31	2.46	16.12

The two specimens of *castanopsis chrysophylla* were quite different in character, the one showing the large percentage of tannin was taken from a shrub, and was received in the moist green condition; the other was from an older tree, and apparently much of the tannin had changed to an insoluble red coloring, which accounts for the low percentage. The low ash cannot, however, be accounted for. Attempts made to purify the tannin were only successful in so far as they determined that the castanopsis tannins are not identical with chestnut tannins, and consequently with gall tannins, but that they are identical with the tannins of the quercus barks.—Amer. Jour. Pharm., Aug., 1897, 406–408.

CONIFERÆ.

Coniferæ—North American Species.—The death of Professor Bastin has brought to a close the interesting contributions on North American species of conifers which has been abstracted for the reports of 1896 and 1897. Prof. Trimble, the collaborator of Prof. Bastin in these papers, communicates the following from material that had accumulated before Prof. Bastin's death, which enabled him to complete the description of the genus *tsuga*.

Tsuga mertensiana, Carr, known as Western or California hemlock, a tree growing on the Pacific coast from Oregon to Alaska, and attaining a much larger height than the Eastern species of *tsuga*, sometimes reaching a height of 200 feet. The microscopical structure of the bark is shown in cross section and in longitudinal-tangential section. The chemical investigation revealed the presence of 5.76 per cent. moisture in the air-dried bark; 1.42 per cent. of ash, calculated for theabsolutely dry bark; and 11.37 per cent. of tannin, also calculated for the dry material, and identical in composition and character with the tannin of *tsuga canadensis*, and consequently with the tannin from a large number of species of oak.

The wood of *t. mertensiana*, which is pale, tough and soft, is often used for building purposes; while the bark of the roots yields a strong fibre that is said to be employed for seines and nets, probably by the Indians. The species

Tsuga Caroliniana, Engelm. closes this series. The Carolina hemlock, which is found along the Alleghany mountains from Virginia to South Carolina, sometimes at high altitudes, attains a height of 40 to 80 feet. The description is given of the microscopic structure of the bark or other portions of this plant, but a chemical examination has been made of the leaves, the stem bark and the root bark obtained from the Highlands Nursery, near Kauana, N. C., with the following results:

	Moisture.	Ash in absolutely dry material.	Tannin in absolutely dry material.
Leaves	7.07	2.70	4.52
Stem bark..............	8.22	1.44	18.35
Root bark....................	5.95	2.20	17.02

While no further investigation was made of the tannin, it is safe to predict its identity with that from the other species. On account of the scarcity of this tree, it does not appear to have been put to practical use. Amer. Journ. Pharm., July 1897, 354–359.

Resin—Necessity for Definite Characterization.—Ferd. A. Sieker observes that the brief description in the U. S. P. of resin (colophony) answers all ordinary purposes, because it is evidently not subject to adulteration. It is, however, sometimes necessary to detect resin in other substances, and a study of its chemical and physical properties is, therefore, of value. In 1892, E. Dieterich found the sp. gr. to vary from 1.076 to 1.079; the acid number, from 162.4 to 175.47, and the iodine number —in an examination of eight samples—from 146.55 to 180.15. On account of the great variations he regards the iodine number as valuless. In 1895, he reported a variation in the sp. gr. of from 1.071 to 1.083, and in the acid number of from 154.0 to 172.2. Mr. Sieker has recently examined a sample. The sp. gr. was not determined, but the acid number was found to be 171.2, and the iodine number 165.9 to 166.7.—Pharm. Review, Jan. 1898, 15.

Larix Occidentalis—Examination of Saccharine Exudation.—Henry Trimble has examined a sweetish exudation collected by Prof. C. S. Sargent, of Harvard University, from the *larix occidentalis* on the upper Columbia river in British Columbia, where it is stated to be used by the Indians as food. It was of a brownish-yellow color, somewhat porous, and possessed only a moderately sweet taste with a terebinthinate flavor. It was freely soluble in water on warming, forming a solution neutral to litmus and reducing Fehling's solution. Its composition was shown to be as follows: Reducing sugar, 19.38 per cent.; non-reducing sugar, 68.69 per cent.; moisture at 100° C., 5.02 per cent.; ash, 0.44 per cent.; wood fibre, &c., removed by filtration, 6.47 per cent. The reducing sugars had many of the properties of dextrine, but gave only a slight precipitate with phenylhydrazin. The non-reducing portion closely resembled dextrin. The absence of a very sweet taste and a number of other properties showed this exudation to be entirely different from the exudation from *larix europæa*, known under the name of Briacos manna, and determined by Berthelot to consist chiefly of a sugar which he named melezitose.—Amer. Journ. Pharm., March 1898, 152–153.

CYCADEÆ.

Koonti—("Indian Bread Root")—An Economical Floridian Food.—Dr. A. T. Cuzner, in connection with arrow root and cassava, directs attention to the possible economics of "koonti," the name applied in Florida to the roots of

Zamia integrifolia, a plant growing abundantly in the wild state in South Florida, and, therefore, not needing cultivation. In its foliage this plant bears a resemblance to the palm and tree fern, its affinity being nearer to the latter than the former. The starch obtained from the roots by the crude process of the Seminole Indians, has long been used as food, and is known by the name of "koonti flour," while the root itself bears the name of "Indian bread root." This crude process, as described, is essentially that employed for preparing the starches of the arrow-root and of the cassava--the root being pulped by pounding in a mortar consisting of an excavation in the trunk of a large pine tree, the mass then thoroughly saturated with water in a vessel made of bark, expressed through a cloth, and the starch collected in a deer hide suspended below. The mass remaining on the straining-cloth after having been thoroughly washed to remove the remaining starch, is rejected; the starchy sediment is allowed to remain in the water for several days, is then drained and spread upon palmetto leaves to dry. When dry, it is a yellowish-white flour, and ready for use. When prepared with modern appliances, as is now done at a number of factories, the starch is of very fine quality, and compares favorably with the best Bermuda arrow-root. When the poor whites on the east coast of Florida are greatly in need of money they go to the woods and dig koonti, finding a ready market for the roots. The bread made by the Indians from koonti flour is of a bright orange color, and, being prepared without salt, is rather insipid. Its color is, of course, due to the crude process of preparing the flour.—Amer. Jour. Pharm., April, 1898, 212–214; from Jour. Amer. Med. Assoc., Feb. 12, 1898.

B. ANIMAL DRUGS.

Sponges—Growing Scarcity in Florida Waters.—A writer in "Oil, Paint and Drug Reporter" observes that the eagerness with which the sheep's wool sponge—at the present time found in all the Florida sponge grounds—is sought, has resulted in fishing it very closely, and deeper and deeper bottom has to be resorted to in order to make the fisheries profitable. The sheep's-wool sponge is believed to grow more rapidly than any other species, and from experiments recently made by parties in Key West it would appear that under favorable conditions this species will grow from the beginning to one-tenth of a pound weight in six months, and the opinion is general that good commercial size is attained in one year. The catch of sheep's-wool sponges is estimated at about fifteen times the value of all other species combined. But, although only forty-five years old, the sponge grounds are less productive than formerly. Indiscriminate fishing is admitted by all to be the chief cause of the decrease in the sponge supply, though some experts claim that a portion is due to natural agencies. The taking of small sponges appears to have gone on without reference to the State law which has been in force for several years, and which forbids the sale of sponges less than four inches in diameter across the top. Although an occasional effort has been made to enforce the law, it seems to be held in contempt by fishermen, dealers, or sheriffs, and it is doubtful if the statute has saved a single under-sized sponge, or has proved of the slightest protection to the grounds. The most important remedy suggested by the writer is the cultivation of sponges from cuttings. The growing of sponges from clippings has passed the experimental stage, and from present indications private sponge farms will have become established on parts of the Florida coast before five years have elapsed.—Bull. Pharm., April, 1898, 162.

Sponges—Facts Concerning Italian Fisheries.—Some interesting facts about sponges are given in a recent British consular report. Biologists have observed that though a living sponge is fixed and apparently motionless, the holes in its surface are capable of opening and shutting, and from the largest of them, when open, a stream of water issues which is supplied by innumerable smaller holes, generally invisible except under the microscope. Young sponges swim freely about by means of little waving hairs upon their surface, until they reach an age when they prefer security to independence and monotony to danger. They live on solid food; the water entering by the small pores passes through a system of branching and fine canals, and is collected again by a similar system into the outflowing current from the large holes. At the junction between the two systems of tubes are the most vital organs of the sponge, little swollen cavities of microscopic size walled in with tiny living particles, each bearing a vibrating hair with which it lashes on the current, and a transparent filmy skirt with which it catches any food that may pass. All this labyrinth of canals and cavities is living, soft flesh, set through and through with little flinty needles or thorns to prevent it from falling a prey to the hungry creatures that exist in the water. The sponge of commerce during life shows only the largest of its numerous holes; over all the rest the dark slate-colored flesh forms a continuous film.

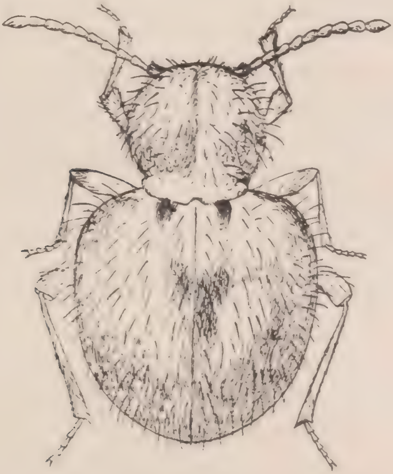
Experiments in "sponge farming" have been made, and its advocates state that if a living sponge be cut into pieces with a sharp instrument, and the pieces fastened to canes immersed in clean sea water, the fragments will grow to marketable size in five years, when they can be fished without expense or trouble. The great practical obstacle is, however, in establishing ownership over a suitable spot, apart from the initial difficulty of finding such a spot. In the ordinary course of "sponge fishing," the fisherman, having once secured his sponge, proceeds to prepare it for the market. The animal rapidly decomposes if exposed to the air, and, therefore, the body has to be rapidly beaten or washed in running water till the fleshy substances are thoroughly removed. If decomposition has advanced too far, no process is known by which the skeleton can be purified and rendered fit for use. The sponges, when cleaned, must be thoroughly dry before they are packed, otherwise they will develop orange-colored spots, which the Greek fishermen call "sponge-cholera."—Pharm. Jour., Nov. 6, 1897, 416.

Silk-Worm Gut—Preparation in Spain.—According to a writer in "Journ. Soc. Arts" (xlvi, 78) Spanish silk-worm gut is prepared as follows: After the grub has eaten enough mulberry leaves and before it begins to spin, it is killed by being thrown into vinegar for several hours. The substance which the grub would have spun into a cocoon is then forcibly drawn out into a much thicker and shorter silken thread. Two such threads are placed for about four hours in clear cold water, after which they are immersed for ten or fifteen minutes in a caustic solution, prepared by dissolving soft soap in water. This serves to loosen a fine outer skin, which is next removed by the hands while the workman holds the thread between his teeth. The silk is then hung up to dry in a shady place. In some cases the silk "guts" are bleached with sulphur vapor, which makes them look beautifully glossy and snow-white, like spun glass, while those naturally dried retain always a yellowish-tint.—Pharm. Journ., Jan. 8, 1898, 25.

Trigonogenius farctus—A New Insect Pest in Argol.—A correspondent of the "Pharmaceutical Era" (July 15, 1897, 68) having observed a few bugs in a case of argol, which had remained unopened for a year, sent them to the editor for the purpose of identification. They were submitted to Prof. Wm. Beutenmüller, Curator of the Department of Entomology of the American Museum of Natural History, New York, who identified them to be

Trigonogenius farctus, a "trig" belonging to the same family to which the common drug-store beetle, *Sitodrepa panacea*, and the tobacco beetle, *Hasioderma serricorne*, belong. It is brown in color, with bulbous body, distinctly piliferous, and while resembling the drug-store beetle in size, is distinctly different in shape. It is not as prepossessing in appearance as the latter, but resembles a minute imitation of the "bed bug," as shown in the accompanying highly-magnified representation. (Fig. 80.)

FIG. 80.



Trigonogenius Farctus.

Cochineal—Investigation of Coloring Matter.—C. Liebermann and H. Voswinckel have succeeded in obtaining two non-substituted products of the splitting up of the coloring matter of cochineal, by the use of persulphates as oxidizing agents. Both of these products are acids. The one, easily soluble, is named by them

Cochinilic Acid.—It is moderately soluble in cold water, but very readily in alcohol, acetone and in glacial acetic acid, while in ether it is somewhat more difficultly soluble. By precipitating its concentrated solution in methyl alcohol by a large excess of chloroform, it is obtained in the form of white needles. It melts at 224° to 225°, and has an elementary composition which leads to the formula $C_{10}H_8O_7$, which would indicate *cresoltricarbonic acid*, though the composition of the calcium salt does not correspond exactly with this view. The aqueous solution of the acid yields a handsome red coloration with ferric chloride. When the acid is treated with bromine water, it yields white needle-shaped crystals having the composition of tribromcresotic acid. The difficultly soluble acid obtained as the second product has been named by the authors

Coccinic Acid. It forms colorless needles which melt at 293°, gives in aqueous solution a somewhat more violet-colored reaction with ferric chloride, and has the composition corresponding to the formula $C_9H_8O_5$, thus pointing to *cresoldicarbonic acid.*—Pharm. Centralh., July 1, 1897, 422; from Ber. d. Deutsch. Chem. Ges., 1897, 688.

Bees—Immunity to the Sting.—Dr. Langer states that he found the majority of bee-keepers in his district (in Bohemia) acquire a complete immunity to the sting of bees, while some seem to enjoy that immunity from the first, possibly by inheritance. In some cases it was so complete that, when intoxicated, men had been stung in from fifty to one hundred places with less suffering than is felt by most persons from flea-bites. Dr. Langer found the poison to be an animal alkaloid, and not, as is commonly believed, formic acid. The best treatment is a subcutaneous injection of a 2 to 5 per cent. solution of potassium permanganate.—Amer. Journ. Pharm., May 1898, 244; from The Practitioner, Febr. 1898.

Kousso Honey—Anthelmintic Properties.—It is stated that King Menilik, of Abyssinia, learning that kousso flowers are valuable as an anthelmintic, conceived the idea that honey gathered from these flowers might also possess this valuable property. He accordingly planted numerous trees—*brayera anthelmintica*—in his garden, and at the flowering season placed bee hives near them. With the honey stored from them experiments were made which proved that in doses of a tablespoonful dissolved in water it had the desired effect.—Pharm. Post, 1898, 120.

Honey-Poisoning.—C. D. Voorhees reports on an interesting case of poisoning by honey. The patient complained shortly after his mid-day meal, at which he had eaten a quarter of a pound of honey in the comb, that a strange feeling came over him; an incessant burning of the forehead, all sorts of objects, wheels, strings, etc., appeared to pass before his eyes; his face felt flushed, but was pallid. His symptoms an hour after the meal were extreme pallor, cold skin, heart weak and irregular, eyes dull. He seemed in a dazed condition and complained he could not see. Ipecac was administered. Convulsive movements of the hands were controlled by holding them firmly, a convulsion of the whole body followed in about one minute, followed by exhaustion and unconsciousness. Breathing, fast and heavy. After vomiting freely, consciousness began to return. A feeling of coldness and exhaustion was relieved after some hours by administration of stimulants and heat. After seven hours he was comfortably warm, the only remaining symptoms being widely dilated pupil, a tingling sensation on tip and sides of tongue, and a feeling of exhaustion. The honey consumed had a decidedly bitter taste.—Pharm. Review, March, 1898, 114; from Therap. Gaz. 22, 144.

Bees' Wax—Unsatisfactory Commercial Quality.—Charles H. LaWall's experience during the year 1897 is very unfavorable in so far as the commercial quality of bees' wax is concerned. Of sixteen samples examined, only seven answered all the requirements of pure wax. Five contained small quantities of stearic acid; one contained a larger amount of stearic acid, and three contained paraffin in varying quantities. The samples containing paraffin were of a suspicious appearance, while those containing small quantities of stearic acid were not materially altered in appearance, though unfit for some purposes.—Amer. Jour. Pharm., Dec., 1897, 621.

Bees' Wax—Examination.—Dr. B. Niederstadt states that the tests laid down by the German Pharmacopœia are not conclusive for determining the purity of bees' wax. One must take into consideration the specific gravity, the melting point, and Hübl's ether, acid, and saponification numbers. For pure wax, the acid number should be 20, the ether number 75, and the proportionate number 3.75; but while these numbers are approximately correct, allowance must be made for more or less variation, due to processes of purification, and care must consequently be taken in drawing deductions from the results obtained. The range of variations, according to the author, is from 19.5 to 23.5 for the acid number, and from 73 to 84 for the ether number. How these different numbers and factors vary, is shown in the results obtained with wax adulterated with paraffin and ceresin, or with stearin:

	Wax adulterated	
	With Paraffin and Ceresin.	With Stearin.
Acid number	9	30.99
Ether number	30.1	63.40
Saponification number	40.1	94.39
Proportionate number	3.45	2.05
Specific gravity	0.952	0.9385
Melting point	25.5° C.	65° C.

When adulterated with tallow, the wax gives off a disagreeable odor on heating, shows an acid number of 10 and an ether number of 185.—Amer. Drugg., Oct. 25, 1897, 246; from Proc. Soc. Germ. Nat. & Phys., Sept., 1897.

Wax—Relative Value of Estimation by the Hot and Cold Methods of

Saponification.—Karl Dieterich has conducted a series of experiments after the method of Hübl (hot saponification and the method of Henriques (cold saponification, on a considerable number of pure waxes, partly with a view of ascertaining the manner in which adulterations influence the normal wax numbers (saponification numbers, etc.), and partly to establish a possible superiority of one method over the other. As a result of his experiments he has arrived at the following conclusions: That the cold method yields results, in the case of a pure wax, which, while they approximate those obtained by the hot method, only in rare cases agree exactly with them. The results so obtained, nevertheless, are, as well as the ones obtained by the hot method, conclusive, and may serve as standards. In doubtful cases, where uncertain results only are obtained by the hot method, the cold method results may be accepted as decisive. As a means of detecting adulterations (with the possible exception of cerasin) this method has fully sustained the claims made for it. It must not be forgotten, however, that the figures never exactly correspond with those of the other method. This, however, cannot be expected when the fact that wax never represents a perfect homogeneous body, is taken into accouut. How the adulterants present in wax influence its general properties may be perceived from inspection of the following table:

Stearic acid raises the gravity and also the acid and saponification numbers.

Ceresin lowers the acid, ester and saponification numbers.

Carnauba wax lowers the acid number, in consequence of which the ratio number becomes abnormal. The gravity is raised.

Japan wax raises the gravity, also ester and saponification numbers.

Lard lowers the gravity and raises ester and saponification numbers.

Suet lowers gravity and raises ester and saponification numbers.

Colophonium raises gravity, also saponification and acid numbers, and lowers ester number.—Amer. Drugg., June 10, 1898, 313: from Helfenberger Annalen.

Japan Wax—Commercial Quality.—In a previous paper (see Proceedings 1897, 68), Charles H. LaWall called attention to the extensive adulteration of Japan wax with starch. He has since then examined over three hundred cases of this wax, and found them, without exception, to comply with the requirements of a normal product. The melting point ranged from 50° to 54° C.; the sp. gr., from 0.965 to 0.984: the acid number, from 17.98 to 20.45, and the saponification value from 217.93 to 224.86. Slight variations were observed in the physical characters, but these might be due to variations in age, or to the methods of preparing the wax for the market.—Amer. Jour. Pharm., Dec. 1897, 620.

Chinese Wax—Chemistry of its Constituents.—Henriques finds that the chief constituent of Chinese wax, produced by *coccus ceriferus*, is the cerotinic ester of ceryl alcohol. From the acid number of free cerotinic acid, he concludes that $C_{26}H_{52}O_2$ is the correct formula for this body, which when pure, melts at 78.5° C. Ceryl alcohol has the composition $C_{26}H_{54}O$, and is converted into cerotinic acid by the action of soda lime. The formula for the ester is therefore $C_{26}H_{51}O_2.C_{26}H_{53}$.—Pharm. Journ., Oct. 2, 1897, 299: from Chem. Zeit., xxi, 171.

Cantharides—Reliable Method of Assay.—Prof. H. G. Greenish and Harold Wilson have contributed a paper on the pharmacy of cantharides in which they communicate the results of comprehensive experiments undertaken primarily for the purpose of establishing reliable formulas for making the different cantharides preparations of the B. P. A quantity of powdered cantharides of good quality having been secured, the cantharidin was accurately determined in them, and the various official preparations made from them; these in their turn were assayed in order to ascertain in what degree the flies had been exhausted in their preparation, and on the basis of the results obtained, formulas for their preparation from cantharidin, under the presumption that this is the only active constituent of the flies, are now proposed by the authors. In order to secure reliable data for their purposes it becomes of paramount importance to employ an absolutely reliable process of assay. They pass the different methods that have been proposed for this purpose in review, but find them all defective—not so much by reason of incomplete exhaustion of the flies, but because of loss sustained during the purification of the cantharidin, which, as is well known, is present in the best flies in very small quantity only. They have therefore devised an assay process which is free from these objections, in which they recovered not alone the cantharidin removed with the fat, but also succeeded in separating the whole of the cantharidin from the green resinoid matter with which it is so closely associated, thus obviating the necessity of making a correction for alcohol used.

The process is as follows:

DETERMINATION OF TOTAL CANTHARIDIN.

20 grammes of the flies in No. 40 powder are mixed in a small mortar with 25 Cc. of a mixture of

Glacial Acetic Acid	1 volume.
Rectified Spirit	2 volumes.
Chloroform	3 volumes.

The moistened mass is covered over for about an hour, and then either allowed to dry spontaneously or at a slightly raised temperature. This is easily accomplished without loss of cantharidin. The dried mass is then packed in a Soxhlet extractor and exhausted with chloroform, the latter being first used to rinse out the mortar used.

About one hour will usually suffice for complete extraction if the substance be well packed, but complete exhaustion should always be ascertained by removing the flask with the chloroformic solution, and continuing the extraction with a little fresh chloroform.

The chloroformic solution thus obtained is placed in a separator containing a little water, and the acetic acid, which passes into the water, is almost, but not quite, neutralized with solution of potash, and the whole well shaken.

The chloroformic layer is run off into a glass dish and evaporated, cautiously, towards the end. The residue consists of fat, in which can be seen crystals of cantharidin. The fat is removed by washing with petroleum spirit (the washings being set aside), leaving in the dish crystals of cantharidin mixed with a green substance of a resinous nature. The residue is allowed to dry, and is then washed with successive small quantities of absolute alcohol until all green matter is removed, and perfectly white cantharidin remains. The alcoholic washings are carefully evaporated.

The cantharidin, dissolved or mechanically removed whilst washing out fat with petroleum spirit, is now recovered; 20 Cc. of 10 per cent. solution of caustic potash are added to the petroleum spirit solution, and the mixture warmed until the fat is completely saponified; during this process most of the petroleum spirit is dissipated. The soap solution thus produced is diluted with warm water and transferred to a separator, sufficient petroleum spirit being added to dissolve the fats when liberated; it is now acidified with hydrochloric acid, when the fat acids rapidly rise and dissolve in the petroleum spirit. The aqueous layer is quickly run off from beneath the petroleum spirit solution into another separator, the petroleum spirit solution washed with water and the washings added. The cantharidin is then removed by shaking with successive quantities of chloroform as long as cantharidin is removed; this must be ascertained. In the chloroformic solution thus obtained the residue from the alcoholic washings of the crystallized cantharidin is dissolved.

The chloroform now contains in solution chiefly cantharidin and the green resinous matter previously mentioned. It is placed in a separator and shaken with lime water, containing excess of calcium hydroxide suspended in it, and solution of common salt, the latter causing the chloroformic layer to separate more readily.

In this way the cantharidin passes into aqueous solution, probably as cantharidate of calcium, whilst the chloroformic layer containing green resin and coloring matter is rejected.

The aqueous solution is filtered, acidified with hydrochloric acid, and shaken out with chloroform as before. This chloroformic solution is added to the cantharidin previously separated, evaporated cautiously, dried in a desiccator, and weighed. In this way a crystalline residue of cantharidin only very slightly colored is obtained.

DETERMINATION OF FREE CANTHARIDIN.

This is accomplished in the same way as the determination of total cantharidin, with the exception that the drug is not moistened with the acetic mixture before extraction, and, no acetic acid being present, the washing of the chloroformic solution with water becomes unnecessary.

DETERMINATION OF COMBINED CANTHARIDIN.

The proportion of combined cantharidin present is determined by difference between cantharidin yielded in determining total cantharidin, and that obtained in determining free cantharidin.

Although this process is somewhat lengthy, the authors have the satisfaction of knowing that loss of cantharidin has been carefully guarded against. Applied to two specimens, and making the assay in duplicate in each case, the following mean results were obtained: No. 1 contained .0525 per cent. combined and .5075 per cent. of free cantharidin—total, .56 per cent. No. 2 contained .1725 per cent. combined and .5075 per cent. of free cantharidin—total, .68 per cent. The latter containing the largest total as well as the largest percentage of combined cantharidin, was chosen for making the official preparations, with the view of determining, if possible, the action of the menstrua on the combined as distinct from the free cantharidin. The results are shown in the following table, the figures applying to the cantharidin, as originally determined, in 20 Gm. of the flies:

Liquor Epispasticus.

Cantharidin in flies		.136
" extracted		.141
Excess		.005

Tinctura Cantharidis.

Cantharidin in flies		.136
" extracted by spirit	.123	
" left in flies	.014	.137
Excess		.001

Emplastrum Cantharidis.

Cantharidin in flies		.136
" extracted		.04
" left in flies (by difference)		.096

Emplastrum Calefaciens.

Cantharidin in flies		.136
" extracted by water	.088	
" left in flies	.042	.130
Deficiency		.006

Unguentum Cantharidis.

Cantharidin in flies		.136
" extracted by oil (free)	.049	
" left in flies (free)	.036	
" " " (combined)	.034	.119
Deficiency		.017

Guided by these figures, the authors propose that the different preparations be hereafter made from cantharidin, which is easily manufactured and obtainable, the proportions corresponding as nearly as possible to those actually found in their experiments, thus:

	Found.	Proposed.
Acetum Cantharidis		1 in 2000
Emp. Calefaciens	1 in 5454	1 in 5000
Emp. Cantharidis	1 in 1500	1 in 1000
Liq. Epispasticus	1 in 588	1 in 300
Tinct. Cantharidis	1 in 12963	1 in 10000
Ung. Cantharidis	1 in 2653	1 in 3000

With this in view, the authors suggest formulas for each of them, which will be found under their respective headings under "Pharmacy," and which possess the great advantages over those at present official in the B. P. that they are definite in strength and easily prepared.—Pharm. Journ., Mar. 12, 1898, 255–259.

Cod Liver Oil—Absence of Iodine and Bromine.—Charles Gundlich has examined crude cod liver oil, purchased morrhuol (so-called), and a product corresponding to the purchased morrhuol and prepared by himself, and found that none of them contained either iodine or bromine. They did, however, all contain amine derivatives. The authors' morrhuol was obtained by treating a sample of crude oil, free from free acids, having a sp. gr. of 0.923 and a Hehner value of 95.15, with 80 per cent. alcohol, and evaporating the alcohol from the extract. The product had a sp. gr. of 0.900 at 19° C. and congealed at 4° C. It corresponded in these respects, as well as in taste, odor and color with two samples of purchased morrhuol, the one of foreign and the other of domestic source. The author is, therefore, of the opinion that the commercial product is prepared in a like manner from any crude product sold as cod-liver oil.—Amer. Journ. Pharm., Dec. 1897, 644; from Journ. Pharmacol. 4, 223.

Cod-Liver Oil—Detection of Seal Oil by Means of the Oleorefractometer.—According to the experiments of Edwin Dowzard the presence of seal oil, which cannot be detected as are the liver oils of other fish by Kremel's color reaction with nitric acid, can be detected with certainty in cod-liver oil by means of Amagat and Jean's oleorefractometer. Pure, pale (refined) seal oil showed in three examples the refraction numbers +32.0, +32.0 and +32.5, while in fourteen samples of cod-liver oil, of which one was English, six Norwegian, and seven Newfoundland oils, the refraction numbers varied practically from +44 to +45, there being only one sample, a Norwegian, in which the number was +43.5. Taking the average as +44.5, the following numbers were obtained with cod-liver oil and seal oil mixed in proportions indicated in the table:

Cod-liver Oil.	Seal Oil.	Refractometer figure at 22° C.
100	0	+44.5
90	10	+43.25
80	20	+42.0
70	30	+40.75
60	40	+39.5
50	50	+38.25
40	60	+37.0
30	70	+35.75
20	80	+34.5
10	90	+33.25
0	100	+32.0

As pure cod-liver oil varies between such narrow limits, the determination of the refractometer number appears to be of some value. It is absolutely necessary that the oil should be first agitated with alcohol (sp. gr. .800), the mixture heated at 30° C., then allowed to separate, and the oil finally dried at 110° C. Until more pure samples of cod-liver oil have been examined, it will perhaps be well to take +43.5 as the minimum figure.—Pharm. Journ., June 4, 1898, 532.

Cod-liver Oil—Therapeutic Efficiency Dependent Upon its Food-Value.—Prof. John M. Francis observes that of late years there have appeared a number of articles concerning the so-called "alkaloids," or "active principles" of cod-liver oil, in which the endeavor is made to prove that these chemical compounds represent the virtues commonly attributed to the oil itself. The author discusses the question at some length, and calls attention to numerous inconsistencies in the view held by some writers that these so-called "alkaloids" can replace cod-liver oil itself. He emphatically maintains that "cod-liver oil must be regarded simply as a food, and one of such great and peculiar efficiency that it deserves to be classed as a therapeutic agent by virtue thereof."—Bull. Pharm., March, 1898, 104.

Ambergris—Development of Odor due to Bacteriological Influences.—H. Beauregard had formerly shown, in concert with the late Professor G. Gouchet, that ambergris is a calculus which is developed and has its seat in the rectum of the sperm whale. In continuation of his studies he now finds that this calculus, composed of crystals of ambrine mixed with a larger or smaller amount of black pigment derived from the rectal lining, contains also star-coral debris. When it is fresh, *i. e.*, when it is just extracted from the rectum by the fishermen, it is of a soft consistency, and its odor is not at all agreeable, on account of its predominant excrementitious character. But after being preserved for some years in an air-tight tin case, it is gradually freed from this excrementitious odor, though losing little of its weight, and retains merely a delicate perfume, *sui generis*, which gives it such a value that it reaches the price of from 3000 to 7000 frs. per kilo. This is not a case of slow desiccation, and cannot be imitated or accelerated by the withdrawal of water. The change is due to a microbe, for which the author proposes the name *spirillum recti physteris*. As regards polymorphism, this microbe is comparable to the spirillum of cholera. It is probable that the destruction of the fæcal odor and the genesis of the delicate perfume are microbial phenomena. It remains to determine if the spirillum in question is pathogenous, at least for terrestrial animals.—Chem. News, Aug. 20, 1897, 93; from Comptes Rendus, cxxv., 254.

Heloderma Suspectum, Cope—A Poisonous Lizard.—See *Lizard Venom*, under "Organic Chemistry."

Thyroid Gland—Significance and Transformation of the Albumen-Iodide.—F. Blum discusses the significance and transformation of the albumen-iodide in the thyroid gland. Heretofore the opinion has generally prevailed that iodothyrin was really the effective substance of the thyroid gland, and that it existed in the gland partly as such, but in greater part combined with albumen. The author now shows by his investigations that the iodothyrin is really only a decomposition product of the organic iodine compound as contained in the gland. The albumen-iodide originates in the gland by its ability to pick up the iodine preparations introduced into the system, and to convert them completely into its own peculiar iodine compound. It holds on to this iodine supply with great tenacity. Eventually, this albumen iodide is given over to the circulation by the thyroid gland, and is then in the body decomposed with liberation of iodine, which, when freed, is expelled for the greater part by means of the kidneys. The changes produced in iodine preparations when introduced into the body, have for their ultimate end the liberation of iodine. The gland itself takes up a relatively very small amount of the total iodine, but after having remodeled it into its own peculiar albumen-iodide, it holds the iodine supply thus obtained for a long time. It is entirely possible that during this time more or less extensive iodine exchanges take place in the gland itself, the purpose of which may be sought for in the attempt to neutralize toxic substances by iodating them. Experiments have proven that by iodating the toxic principles taken up by the thyroid they may be made perfectly harmless. These principles are very detrimental to assimilation, and can withstand many strong physical and chemical agents. The iodine which is liberated in the gland finds in the gland toxic albumens with which it reacts forming perfectly harmless compounds, and it is in this process that we see the true function of the gland and its albumen iodide.

Whether other similarly acting compounds are formed in the gland is as yet difficult to decide.

The activity of the gland may therefore be summed up as follows: The gland takes up specific toxic substances arisen in the body and passed into the general circulation and forms albuminous bodies with these which do not leave the gland before they have been made perfectly harmless. One of the means of taking away the toxicity of these compounds is by iodating them. If a continual iodine liberation takes place in the gland it is possible that the iodine is the only active anti-toxic principle of the gland; if not, it would be an entirely legitimate assumption that still other processes are instrumental in rendering harmless the toxalbumens imprisoned in the gland.—Pharm. Review, May, 1898, 204; from Apt.-Ztg., 13, 212.

Glandular Remedies—Effective Exhibition in Organotherapy.—Briefly alluding to Prof. Victor Horsely's classical experiments conducted under the dominant idea to supply from the healthy organs of some animal the deficiencies of the patient's secretory glands, J. C. McWalter discusses the methods suitable and unsuitable for their medicinal exhibition. He observes that Dr. Horsely's experiment proved that to graft the glands on the living animal produced the best results, but that to consume them as an ordinary article of diet was also efficaceous, whilst even to cook them like ordinary meat did not destroy their virtues. This evidence of their non-protean or stable character has unfortunately stimulated manufacturing chemists to take extraordinary liberties with it, and to indulge in a series of vagaries as to the form in which it should be dispensed. Thus the glands are dried, powdered, compressed into pellets, are macerated in glycerin, alcohol, or other solvents, with the result of the most contradictory reports concerning their effects. In the author's opinion the compressed tablet form is about the worst possible to elicit the virtues of the gland. It is a blunder to dry it, a worse blunder to powder it, and a grievous error to mix it with any other powder, whilst to compress the product is to still further alieniate the chances of the active principle of the gland, whatever it may be, entering the system. Indeed, he believes that the various serious symptoms which physicians have found to follow their administration were due to various toxalbumins generated by the action of moist air on the tablets. The remedy for all this lies in following in the preparation of gland remedies, as nearly as possible, the physiological process that takes place normally in the organism. The process of secretion in any gland may very roughly be considered as an osmosis—that is, certain constituents of the blood are elaborated and allowed to filter through, by means of a differentiated epithelium and a basement membrane. Copying such a process, it was suggested to remove the organ immediately on the death of the animal, so that the molecular life of the organ may, if possible, be preserved, and at once macerate them in a sterilized solution of glycerin, made alkaline or acid according to the nature of the gland—thus, for the páncreas an alkaline solution, and for the stomach a slightly acid one, and the resulting solutions should afterward be subjected to a process of dialysis, which will probably be found of great value and particularly useful in separating the colloid constituent, and obtaining a close approximation of the active principle. The orchitic extract, which since the demise of Dr. Brown-Séquard and the introduction of the tablet form has fallen into disuse, will probably be found of great use when a really active extract shall be produced. The method advocated is to macerate the fresh sliced glands in a solution containing 30 per cent. of glycerin, and 0.6 per cent. each of sodium chloride, sodium phosphate, and sodium bicarbonate. This same solution will probably be found best for the ovarian extract, while for the extraction of red bone marrow glycerin pure and simple is probably the best solvent. The necessity of securing proper asepsis during the processes of preparation is all important, such being in part accomplished by the immediate immersion of the glands in some such preserving fluid as glycerin.—Trans. Brit. Pharm. Con. (Yearbook of Pharmacy), 1897, 360–363.

Thyroid Extract—Galactogogue Action.—In a communication to the "Intercolonial Med. Journ. of Australia," Dr. Stawell states that from observation in several cases he is inclined to attribute a marked galactogogue action to thyroid extract, its action in the cases noted being very marked, while the milk secreted appears to be perfectly normal in character. No alterations in the diet or habits of the patient were made during the treatment.—Pharm. Journ., Feb. 26, 1898, 186; from Therap. Gaz., xxii, 49.

INORGANIC CHEMISTRY.

GENERAL SUBJECTS.

C. P. Chemicals—Are They Chemically Pure?—Charles H. LaWall, as the result of his inquiries, finds that while there are some exceptions, chemicals when designated C. P. conform to the requirement "chemically pure," as closely as is practicable. He calls attention to certain inconsistencies of the U. S. P., in which, for instance, sodium carbonate and bicarbonate may contain a limit of chlorides and sulphates, whilst in the benzoate, salicylate and other sodium salts, they are rigidly excluded. Such increased requirements for purely medical compounds are hypercritical, and should only apply to chemical reagents.—Proc. Penna. Pharm. Assoc., 1897, 76.

Chemically Pure Acids—Commercial Quality.—Ambrose Mueller reports the results of the examination of five commercial samples each of hydrochoric, nitric and sulphuric acid, and expresses his gratification at the results, since in every case they came up fully to the official requirements, and particularly so in respect to their specific gravities and absolute acid content. Indeed, the error, if any, was on the side of higher specific gravity and greater strength than required. — Proc. Mo. Pharm. Assoc., 1897, 80.

NEW ELEMENTS.

New Element?—Supposed Presence in Cast Iron.—G. G. Boucher believes to have discovered a new element in cast iron, in which he found it in microscopically small percentages. It is precipitated from the solution of the iron in diluted sulphuric acid by sulphuretted hydrogen, forming a dark brown sulphide which is soluble in alkalies, ammonia, alkaline sulphide and nitric acid, but insoluble in dilute hydrochloric or sulphuric acids. It yields upon heating in a current of air a yellow oxide, which liquefies at a red heat. The metal itself is insoluble both in diluted sulphuric and hydrochloric acids, but is soluble in nitric acid, and burns when heated in air with formation of a yellow, sublimable oxide. Spectroscopic investigations are being made by Crookes to determine its claims as a new element.—Pharm. Ztg., Dec. 22, 1897, 869.

Krypton—A Fifth Constituent of the Atmosphere.—On June 6th, 1898, Prof. Ramsay communicated to the Academy of Science of Paris the discovery of a new element, a gas, which is present in atmospheric air in very small quantities—1 in 10,000 volumes. It has been named krypton; belongs not to the argon, but to the helium group, and has a density greater than nitrogen, viz., 22.47. It was obtained from a large quantity of liquid air, supplied by Dr. Hampson. The spectrum of the new element, while not yet entirely disentangled from the spectrum of argon, is characterized by two very brilliant lines, one almost identical with D_3, and another very strong in the green. The atomic weight of krypton will probably be found to be 80.—Chem. News, June 10, 1898, 270.

Neon and Métargon—A Sixth and a Seventh Constituent of the Atmosphere.—At a meeting of the Royal Society on June 16, 1898, Professor Ramsay and Mr. Morris Travers called attention preliminarily to two new constituents of the atmosphere, the existence of one of which had been intimated when at the meeting of the society on June 9th they had described their identification of krypton as a constituent of atmospheric air. While the authors have as yet been unable to obtain these two new elements, which they have named *neon* and *métargon* respectively, their experiments have been sufficiently advanced to justify the announcement of their existence. A quantity of argon having been liquefied, a colorless fluid was formed, from which a considerable quantity of a solid substance was found to separate. A gas also remained, which was removed for further examination. This solid substance bears a close relationship with argon, and hence was called "métargon." The gaseous substance is "neon," which promises to be the more interesting of the two, since it seems probable that it constitutes the missing link in the interval between argon and helium, which, if the Periodic Law of Mendeleeff holds good, should be a gas with a density of 10, or at most, 11. By the processes of purification employed, the density of neon has been reduced from 17 to 14, and the experimenters are convinced that a further lowering will be made as they continue their experiments.—Chem. News, June 24, 1898, 295–296.

OXYGEN.

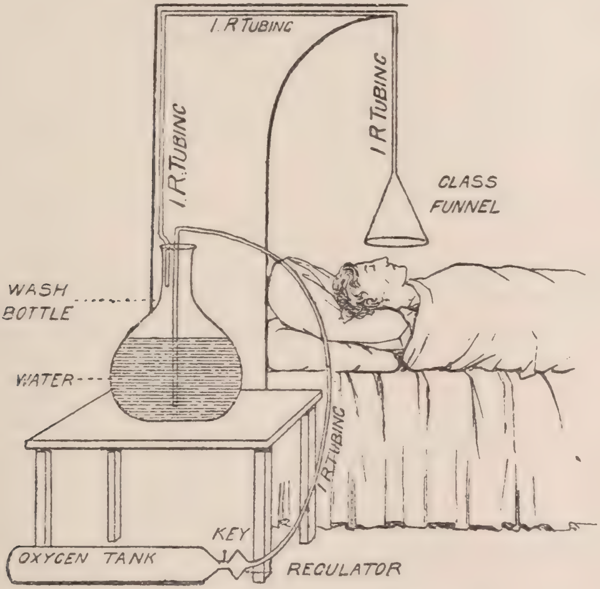
Oxygen—Revival of An Old Process of Preparation.—By the use of improved apparatus and methods, Dutremblay and Lugan hope to reintroduce the process used by Tessié du Motay for the commercial production of oxygen in 1867, but since abandoned. This process consisted in decomposing, by means of superheated steam at 500°, the alkaline manganates, which are re-generated at the same temperature by a dry current of purified air. The apparatus required is an air-pump, a purifier (to remove the CO_2 and H_2O), a furnace for the manganates, an automatic distributor (to introduce alternately air and steam into the retort), and a gas holder furnished with a refrigerator to condense the watery vapor drawn in. The reactions take place at a low pressure, and as the oxygen is carried into the gas-holder by means of the steam instead of through a pump, it is kept perfectly free from carbides. The old disadvantages, which consisted in the caking of the charge and the evaporation of soda, have been rectified and done away with, and there is no longer now any danger of explosions occurring.—Chem. News, Jan. 7, 1898, 11; from Journ. de Pharm. et Chim. No. 9, 1897.

Oxygen—Apparatus for Administration.—Geo. Lunan has constructed and recommends the apparatus shown by the accompanying cut (Fig. 81) for the convenient administration by inhalation of oxygen at the bedside. The tank containing compressed oxygen is screwed to the regulator in the customary way, and the latter connected by rubber tubing to a large wash bottle containing water. The gas from the wash bottle is conveyed by tubing to a convenient position over the patient's mouth, where it is allowed to diffuse by the aid of a glass funnel attached to the tubing, as shown in the illustration. With the increased use of oxygen as a remedial agent, this simple contrivance commends itself to the dispensing pharmacist, and may enable him to control the sale of the gas in his locality.—Pharm. Journ., April 23, 1898, 388.

HYDROGEN.

Hydrogen—Caloric a Factor in Determinining its Nascent Activity.—D. Tommasi considers that nascent hydrogen is synonymous with "hydrogen plus caloric," the greater affinity of the gas in the so-called nascent state being due simply to the fact that the hydrogen, at the moment when it is set free, is accompanied by all the heat which is produced while it is being set free. On this assumption, therefore, the differences observed in the hydrogen produced by different chemical reactions are explained by the fact that these reactions are not accompanied by the production of the same quantity of heat. Thus, by the action of $SO_4H_2 + Aq.$ on Zn, 38.0 cals. are produced; on Cd., 23.8 cals.; on Mg., 112.0 cals.; by the action of $2HCl + Aq.$, or $2HBr + Aq$ on Zn., 34.2 cals.; and by the action of sodium amalgam on water, 112.0 calories are produced, the figures indicating the amount of heat given off by the chemical reaction which results in the evolution of hydrogen. This caloric value is shown to vary with each chemical reaction; consequently the hydrogen evolved should be the more active as the caloric value increases.—Pharm. Journ., April 30, 1898, 410; from Monit. Scient., (4) xii., 182.

FIG. 81.



Apparatus for Administering Oxygen.

Hydrogen—Liquefaction.—After many failures and defeats in the attempt, Professor James Dewar, on May 10, 1898, succeeded in liquefying hydrogen. This experiment was started with hydrogen cooled to —205° C., and escaping continuously under a pressure of 180 atmospheres from the nozzle of a coil of pipe, at the rate of 10 to 15 cubic feet a minute, in a vacuum vessel doubly silvered, and of special construction, surrounded with a space kept below —200° C. With these arrangements liquid hydrogen began to drop from this vacuum vessel into another, doubly isolated by being enclosed within a third, and in five minutes 20 Cc. of liquid were collected. The hydrogen jet then froze up from the solidification of air in the pipe of the apparatus. The yield of liquid was about 1 per cent. of the gas. In the liquid condition the hydrogen was clear and colorless, showing no absorption-spectrum, and the meniscus was as well-defined as in the case of liquid air. The liquid must have a relatively high refractive index and dispersion, and the density must be in excess of the theoretical values, viz., 0.18 to 0.12, deduced respectively from the atomic volume of organic compounds and the limiting density found by Amagat for hydrogen gas under infinite compression. Professor Dewar also succeeded in liquefying

Helium.—Having a specimen of purified helium, extracted from Bath gas, sealed up in a bulb with a narrow tube attached, he placed the latter in the liquid hydrogen, whereupon a distinct liquid was seen to condense. From this result it would appear that there could not be any great difference in the boiling-points of hydrogen and helium. Finally, speaking of the

Liquefaction of Gases, Professor Dewar pointed out that all known gases had now been condensed into liquids which could be manipulated at their boiling-points under atmospheric pressure in suitably arranged vacuum vessels, though even so great a man as Clerk-Maxwell had doubts as to the possibility of ever liquefying hydrogen. With liquid hydrogen as the cooling agent, a temperature could be reached within 20° or 30° of the zero of absolute temperature, and its use would open up an entirely new field of scientific inquiry. No one could predict the properties of matter near that zero. Faraday liquefied chlorine in the year 1823. Sixty years afterwards, Wroblewski and Olszewski produced liquid air, and now, after an interval of fifteen years, the remaining gases—hydrogen and helium—were obtained as static liquids. Considering the step from the liquefaction of air to that of hydrogen was relatively as great in a thermo-dynamic sense as that from liquid chlorine to liquid air, the fact that the former had been achieved in one-fourth the time needed to accomplish the latter proved the greatly accelerated rate of scientific progress in the present age.—Chem. News, May 20, 1898, 227.

Liquid Hydrogen—Boiling Point and Density.—In continuation of his researches above mentioned, Prof. Dewar has determined two of its physical constants—the boiling point and density. The boiling point in air is —238° C., or 35° absolute, determined by a platinum resistance thermometer. The whole range of liquid hydrogen is only about 50° from the absolute zero, because its critical point must be about 50° absolute. Thus it appears that there can only be a few degrees + or — in the different estimates based on theoretical conceptions of the boiling point, and this value of the boiling point enables us to predict with almost certainty that by no conceivable means at our present command shall we ever get nearer the absolute zero than − 250°, or say, − 20° absolute. The density of hydrogen was determined by allowing 10 Cc. of liquid hydrogen to evaporate, collecting the gas and measuring its volume. The resulting value comes to be a number rather less than 0.07, or about one-fourteenth the density of water. The author concludes that liquid hydrogen is in all respects the most extraordinary fluid chemists have ever had to deal with. No chemist could have anticipated that a liquid with a density of one-fourteenth that of water could have been capable of collection and manipulation in vacuum vessels with the same ease, practically, as manipulation with liquid air was carried on ten years ago, and that by its means we shall approach within 20° to 25° of the absolute zero.—Chem. News, June 3, 1898, 261.

Water—Sterilization by Means of Infusorial Earth.—J. Hauser has found that of all the substances he has tried for the purification of water by filtration, the infusorial earth called "kiesselguhr" has given the best results. It is prepared by first finely sifting, to remove all large particles, and then heating to about 800° or 1000°. On cooling, it must be powdered and levigated to obtain an impalpable powder—though this last operation is only necessary when certain special solutions have to be dealt with, experience alone showing when. To use it, the powder is mixed with a little water and thrown on a filter; as the liquid passes through, the powder remains, and forms a perfect layer for filtration and sterilization.—Chem. News, April 22, 1898, 188; from Compt. rend., March 14, 1898.

Drinking Water—Purification by Bromine Water.—Schumburg, who has thoroughly investigated the different methods proposed for purifying drinking water, finds that bromine is the only disinfectant which can be removed after serving its purpose, without spoiling the appearance and taste of the water. The quantity of bromine used is very small; one kilogram is sufficient to sterilize 16,000 liters of water. The author uses the bromine in the following solution: Water, 100; potassium bromide, 20; bromine, 20. 0.2 Cc. of this solution is sufficient to sterilize in five minutes 1 litre of water from the river Spree. The calcium salts or ammonia of very impure river or surface water use up some of the bromine before it has had time to develop its disinfectant properties. In such cases enough must be added to cause a slight yellow coloration of the water, which should last at least half a minute. The 0.2 Cc. of bromine solution may be removed by adding an equal quantity of 9 per cent. ammonia. —Pharm. Zeitg., xlii., 174.

Potable Water—Significance of Nitrates Present.—John C. Thresh observes that there is a tendency among analysts to take one or other of the extreme views with reference to the significance of nitrates in drinking-water. Either they have held that the estimation of the nitrates was of no importance, or that the amount of nitrates was one of the most important factors in determining the purity of water. The author's position is this—that the amount of nitrates which would be of special significance in water from certain sources, has comparatively little significance in a water from other sources. His position is made clear in the following table, giving the results of the analyses of certain potable waters, together with his opinions thereon, based (1) on his examination of the wells from which the water was taken, and (2) on the analytical results:

No.	Free Ammonia.	Organic Ammonia.	Nitric Nitrogen.	Chlorine.	
1	.68	.03	1.05	509	Quite safe.
2	.40	.02	.71	506	Liable to pollution, and therefore unsafe.
3	.40	.05		531	Impure. There is some dead animal in the well (a rat or mole). Water contains hairs and a small bone.
4	.00	.005	14.	33	Dangerously liable to pollution. Caused an outbreak of typhoid fever.
5	.00	.03	8.6	23	Quite safe.
6	.01	.06	20.	50	Bacteriologically unsatisfactory. When examining the source of the public supply, I found a large dead well, receiving sewage, within 30 ft. of the collecting reservoirs. Another, equally near, has since been found.
7	.00	.10	14.	70	Quite safe. No possibility of dangerous pollution.
8	.96	.40	31.	174	Dangerously polluted.
9	.00	.06	13.	26	Quite safe.
10	.00	.03	15.	27	Quite safe; being adapted for a public supply.

Nos. 1 to 3 are waters from wells 300 feet deep; 4 to 10 are from shallow wells in porous soil.—Chem. & Drugg., Dec. 4, 1897, 883–884.

Distilled Water—Inexpensive and Automatic Apparatus.—Dr. H. T. Cummings, after describing the character of "natural water" and "distilled water," requisite to meet pharmacopœial requirements, and describing several methods proposed for the purification of water by chemical means, describes an inexpensive, effective and automatic distilling apparatus which can be used with little or no trouble by any pharmacist. Procure a square copper boiler of say two or three gallons capacity. Have a half-inch pipe inserted in the median line two inches below the upper edge. This pipe should be three inches long, and bend downwards, even vertically. By a rubber tube join this pipe to the inner tube of a ten-inch Liebig condenser (costing 85 cents.) With the other end of the inner tube of the condenser connect either a rubber tube or a crook-necked glass tube, which let protrude into a gallon bottle. Here, then, are still, condenser, and receiver. Now through the jacket of the condenser water at ordinary temperature must be kept running in order to condense the steam which passes through the inner tube. For this purpose set at some height above the condenser a pail of ordinary tap water. With a rubber tube siphon this water to the lower end of the condenser, regulating the flow by a pinch-cock. To catch the water as it emerges from the upper end of the condenser place a pail beneath the outlet pipe. The condenser (supported by a clamp or otherwise) will have to be inclined at such an angle that the condensing water will run in at the lower end and out at the upper without any difficulty. The copper boiler (the still) may be placed on an ordinary stove, or better and more convenient, on the oil-stove in the back room. This apparatus set up will work automatically, the only attention required being to refill the pail of condensing water as, at rare intervals, it becomes emptied. Distilled water made so easily, so cheaply, and so effectively, the pharmacist has no excuse for not using it whenever necessary.

The received bottle should of course first be rendered as chemically clean as possible, and the tube which conducts the distilled water into it should be packed at the mouth of the bottle with absorbent cotton, closely enough to exclude floating dust, germs, etc., but not tight enough to create pressure. The first tenth of the distillate should be thrown away, as it contains carbonic acid, ammonia, and other volatile impurities, and the last tenth of the water should not be distilled, lest it pass over with an empyreumatic taste. The distilled water so obtained must, however, be carefully preserved from chemical accretions, through dust, etc., and from bacterial contamination. To this end, the author quotes the remarks made by Dr. E. R. Squibb on this subject at one of the sessions of this Association (see Proceedings, 1873, p. 98 . Bull. Pharm., May, 1898, 196.

Hydrogen Peroxide—Preparation.—Pedro Etchegorry recommends the following method for rapidly preparing pure hydrogen peroxide: One part barium peroxide and two parts (by weight) of hydrochloric acid are triturated together with ice. The resultant solution is filtered and the filtrate treated with solution of silver sulphate as long as a precipitate is produced. Barium sulphate and silver chloride are precipitated, and pure solution of hydrogen peroxide may be filtered off.—Amer. Jour. Pharm., Dec. 1897, 641; from Tribuna Farmaceutica, *1*, 16.

Hydrogen Dioxide—Preservative Effect of Alcohol.—Some observations on the preservation of hydrogen dioxide which are reported in "Le Mon. Scientif." indicated that naphthalin has some influence in preventing evaporation of the dioxide; but as this is generally added in alcoholic solution, the question arose, How far was the preservation due to alcohol? The following results clearly proved that the alcohol, and not naphthalin, was the active agent: "A 5.7 vol. solution (say 100) was exposed to the light and in the dark. In twelve days they showed 64.8 and 73.8, and in sixty-four days 26.4 and 31; with 2 per cent. of naphthalin 78.2 and 23.1

(in the light), with alcoholic naphthalin 95.3 and 84.7, and with alcohol alone 95.3 and 85.1." The percentage of alcohol necessary for the preservation of the dioxide was then tried, and the following results obtained (taking the original strength as 100):

——	0 p. c. Alcohol	0.25 p. c. Alcohol	0.5 p. c. Alcohol	0.75 p. c. Alcohol	1 p. c. Alcohol	2 p. c. Alcohol
After 2 days	78.6	93.0	94.1	94.5	95.0	96.2
4 "	61.7	89.9	91.2	91.9	91.9	93.9
6 "	50.3	86.5	89.5	90.5	90.9	91.0
14 "	32.8	76.7	81.2	82.5	83.8	84.5
25 "	20.7	60.3	70.4	73.8	73.8	75.1
84 "	1.3	5.3	28.5	38.1	39.4	48.9

Ether was found to be slightly better, 2 per cent. (by weight) keeping the dioxide up to 96.2 in eleven days, and to 72 in ninety-five days. The experiments demonstrate the superiority of alcohol and ether over mineral acids as a preservative for this solution.—Chem. and Drugg., Mar. 5, 1898, 400.

Hydrogen Dioxide—Estimation in Presence of Various Preservative Agents.—At the suggestion of Dr. Charles Rice, Carl E. Smith has undertaken an investigation into the comparative accuracy of titrimetric and gasometric methods of estimating hydrogen dioxide in presence of various preservative agents. The method most extensively used is that of titration with potassium permanganate, both on account of its convenience and because it has always been presumed to give sufficiently accurate results for all practical purposes. Dr. Charles Rice, however, has observed that its accuracy is affected by the presence of glycerin, and it is suspected that a variety of other substances added for the purpose of giving stability to its solutions—such as boroglycerin, boric acid, salicylic acid, benzoic acid, acetanilid, salol, &c., might also have an influence on the results of the method. Mr. Smith gives in detail the investigation and experiments made with the view to determine such influence if any upon the various methods in use, and summarizes his results as follows:

The titrimetric permanganate method is accurate and reliable for the valuation of solutions containing only mineral acids and their alkali salts as impurity. With solutions containing glycerin or boroglycerin in quantities below 5 per cent., the results are but slighly raised; in presence of larger amounts the method is inapplicable. Ethereal solutions give results a little too high. Salicylic acid interferes seriously, even in small quantity. The use of this method should be avoided whenever organic matters are suspected to be present. Applied gasometrically, the permanganate method is unreliable in all cases.

The *hypochlorite method* gives serviceable results in absence of preservatives. In their presence they are liable to fall too low, and with ethereal solutions they are too high.

The *thiosulphate method* is simple, rapid and accurate, and its accuracy is not lessened by the presence of the usual preservative agents, nor by large quantities of glycerin. It is applicable in all cases, so far as known. It can be said of *gasometric determinations* in general, that they require more time, attention and apparatus than titration methods, and that the results obtained by them cannot be expected to approach the latter in accuracy, unless suitable corrections, requiring tedious calculations, are made for variation in temperature and atmospheric pressure.—Amer. Journ. Pharm., May, 1898, 225–234.

Hydrogen Dioxide—A New Factor in Spontaneous Combustion.—Charles H. La Wall calls attention to the phenomenon of spontaneous combustion occurring in a cheese-cloth bandage which had been saturated with hydrogen dioxide and applied to the wrist affected by *rhus* poisoning. Several applications, by saturating the bandage, having been made in the morning, after several hours, the patient's attention was directed by the odor of burning cloths and severe pain, to the fact that the bandage was smouldering and was already charred black in many places.—Amer. Jour. Pharm., June, 1898, 291–293.

Hydrogen Peroxide—Cause of Spontaneous Combustion in its Presence. Referring to the preceding observations, E. H. Gane communicates the results of experiments made with the purpose of confirming or controverting the conclusions of Mr. La Wall. The results of the experiments showed that the sulphuric acid plays little part in the reaction, other than to slightly increase the charring process. A similar effect can be produced if the solution of peroxide be neutralized or rendered alkaline. The explanation of the charring is simple when the properties of the peroxide are considered. Hydrogen peroxide, whilst very unstable and easily decomposed in the presence of organic matter, is peculiar in this respect. If pieces of filter paper, cheese cloth or an ordinary bandage be kept constantly moistened with fresh quantities of the solution for some time and then allowed to become almost dry, or better still, if an ethereal solution be used and the ether allowed to evaporate, it will be found that the peroxide has not been entirely decomposed, but will remain in the paper or cloth for some time. If these pieces be then warmed, charring will ensue quickly at a comparatively low temperature, depending on the amount of peroxide in the material. A similar condition existed in Mr. La Wall's bandage. The constant addition of fresh quantities of peroxide solution increased steadily the amount of H_2O_2 in the bandage, and as soon as the wearer neglected to keep down the temperature by adding more of the cold solution, charring ensued, owing to the vigorous oxidation of the cloth, consequent on the rise in temperature caused by the heat of the arm. While it is easy enough to char a bandage with a warm dilute solution of sulphuric acid, the average commercial solution of peroxide does not contain sufficient acid to bring this about.—Amer. Drugg., June 10, 1898, 311.

NITROGEN.

Nitrogen—Advantageous Modification of Kjeldahl's Method of Determination.—Gunning and others have pointed out the advantage of the addition of potassium sulphate in the determination of nitrogen by Kjeldahl's method. This modification of the method is now endorsed by F. Wedemeyer, who finds that the reaction is so accelerated that the operation can be completed within one hour.—Chem. Ztg., 1898 (xxii), 21.

Liquid Air—Industrial Production.– Dr. Henry Morton calls attention to the production on a commercial scale by Chas. E. Tripler, New York city, and explains the conditions under which it is transported in open vessels, as well as some of the experiments made with it by W. H. Dickerson, representing the manufacturer, before the alumni of the Stevens Institute of Technology. The container was a tin can placed in a wooden bucket, such as is used in transporting ice cream, the space between the can and bucket being filled with ordinary hair felt. From this tin can the liquid air was dipped out as required with a tin ladle, exactly as milk would be served from an ordinary milk can. The condition of the liquid air is in fact this: When produced it is of necessity intensely cold, because its critical temperature being about —189° F. no amount of pressure will liquefy it unless it is as least as cold as this. When the pressure is relieved by drawing off the liquid into an open vessel, a portion at once vaporizes, but in so doing cools the rest to a still lower temperature; and when so cold as this the tendency to vaporize is very moderate; so that, if the liquid air is placed in a vessel with non-conducting walls (like the tin can packed with felt in a wooden pail), it will only evaporate slowly, so that a quantity may be kept in this way for six or eight hours with only a trifling loss. The most impressive feature of this exhibition was the large amount of liquid air present and the ease with which it was handled.—Chem. News, March 11, 1898, 113.

HALOIDS.

Halogens—New Method of Separation.—According to A. Carnot, when sulphuric acid, saturated with nitrous acid, is added in the cold to a mixture of haloid salts, only the iodides are decomposed, while the chlorides and bromides remain unaffected. The liberated iodine may be washed out with carbon disulphide, and titrated direct with thiosulphate. If a little chromic acid and sulphuric acid be now added to the aqueous residue, and the whole heated on the water bath to about 100° C. for an hour, the whole of the bromine is liberated in its turn. This also may be washed out with carbon disulphide, and allowed to act on potassium iodide, whereby its equivalent is liberated and titrated as before. In the residue from these determinations, the chloride may be precipitated in the usual way with silver nitrate. If the precipitated silver chloride is discolored by adherent chromate, this may be removed by continuous treatment with nitric acid. The method has given very good quantitative results.—Pharm. Journ., Feb. 12, 1898, 139; from Comp. rend., cxxvi., 187.

Halogens—Quantitative Separation.—Ralph S. Swinton observes that while Mohr's process, which is official in the British, United States and German Pharmacopœias for determination of the purity of halogen salts, if satisfactory when only one of the halogens is present, is misleading or absolutely useless in the presence of a second or third halogen. After much experimenting he found the following methods to answer best, both as regards ease of application and exactness of results:

1. *Iodides—Determination in any Mixture of Haloids.*—Having an approximate idea of the percentage of iodide present, a quantity of the substance corresponding to about 0.2 Gm. of iodine should be taken, (in the absence of such knowledge a rough estimation should be made by the process subsequently detailed,) and dissolved in 10 Cc. of water in a separator, about 5 Cc. of pure sulphuric acid slowly added, and the separator kept cool meanwhile by allowing a stream of cold water to flow over it; then thoroughly agitate first with 5 Cc. liquefied phenol (90 per cent.), next with 20 Cc. saturated bromine water. After agitating with the bromine water there should be no trace of bromine left uncombined; the excess combining with the phenol to form tribromophenol. At the same time the most of the iodine is replaced by the bromine. The iodine is washed out with successive portions of 10 Cc. of chloroform till the chloroform is colorless, two washings usually sufficing. The solution is again agitated with liquefied phenol and bromine water as before, when it will probably be found that more iodine has separated. This is again washed out, the process being continued as long as any trace of iodine is set free, two phenol and bromine treatments usually being sufficient. The mixed chloroform solutions of the iodine are now covered with a layer of water and titrated with $\frac{N}{10}$ solution of hyposulphite of sodium in the usual manner, with starch paste as indicator.

1 Cc. $\frac{N}{10}$ sodium thiosulphate = .01265 Gm. iodine.
1 Cc. " " = .01655 Gm. potassium iodide.

2. *Bromides—Determination in the Presence of both Iodides and Chlorides.*—A solution of 10 Gm. of the mixture of haloid salts in 250 Cc. of water is made, and the iodide in 10 Cc. of this is determined as previously described. The bromine is then determined in another 10 Cc. of the solution, which is acidified with 2 Cc. of a cooled mixture of equal volumes of sulphuric acid and water. The iodine is removed from this by adding the theoretical volume of $\frac{N}{2}$ potassium permanganate solution (which quan-

tity is easily arrived at by dividing the number of cubic centimeters of $\frac{N}{10}$ thiosulphate used in titrating the iodine from 10 Cc. of the solution by 5) and thoroughly washing out with chloroform. This chloroform is run into a 20 oz. stoppered bottle containing 20 Cc. of alcoholic solution of potassium iodide and the treatment with chloroform repeated until the washings are colorless. The bromine in the residue is next set free with excess of saturated solution of potassium permanganate; the bromine is thoroughly washed out with chloroform, which is run into the alcoholic solution of potassium iodide, into which the chloroform solution of the iodine has already been introduced. As before, the bromine replaces an equivalent quantity of iodine from the potassium iodide, and, after dilution with a large volume of water, the total amount of free iodine is determined by titration with $\frac{N}{10}$ thiosulphate. By deducting the number of Cc. of $\frac{N}{10}$ thiosulphate required for the iodide in 10 Cc. of the solution, from the number so ascertained, the amount of bromine may be readily calculated:

1 Cc. $\frac{N}{10}$ thiosulphate = .007976 Gm. bromine.
1 Cc. " = .011879 Gm. potassium bromide.

The precautions absolutely necessary in this process are:

First, to add the chloroform before the permanganate solution, so that the bulk of the bromine set free may be immediately absorbed by the chloroform, in order to minimize the risk of loss of bromine vapor.

Second, to make sure that excess of potassium permanganate solution is present, this being easily ascertained by the persistence of the violet color.

Third, To largely dilute with water before the titration with thiosulphate, in order to obtain the blue color of the iodide of starch, which does not develop in the strong alcoholic solution.—Pharm. Journ., Dec. 25, 1897, 562–564.

Chlorine, Bromine and Iodine—Estimation in Saline Waters.—Percy A. E. Richards, after briefly reviewing various methods for the estimation of chlorine, bromine and iodine in a mixture of the three, observes that while they give satisfactory results so long as one of the halogens is not present in much greater amount than either of the other two, but in the examination of saline water it is almost invariably the case that the amount of chlorine greatly exceeds that of both the other halogens. In such cases the estimation of iodine and bromine by difference is of very little value, and he therefore recommends the following method as giving very good and concordant results. In the first place, the total halogen equivalent in terms of decinormal silver nitrate solution was accurately determined. The iodine present was then estimated by treating 250 or 500 Cc. with acetic acid and hydrogen peroxide for about half an hour, and extracting with chloroform. The mixture was shaken in a separating funnel, with successive small quantities of chloroform, and these washings added to the first portion. The solvent was then well washed with distilled water to remove any peroxide of hydrogen, and was then titrated with decinormal sodium thiosulphate solution. and the amount of iodine calculated. This process, which is due to Cook, is simple and accurate. The bromine was next estimated by shaking the iodine-free liquid left in the separating funnel, with chlorine water and chloroform, avoiding much excess of the former. The solvent was drawn off, and the aqueous solution shaken several times with small quantities of chloroform, the latter being added to the first portion. Any chlorine present is washed out of the chloroform by repeated agitation with distilled water, and the bromine estimated by adding a few crystals of iodide of potassium and titrating with thiosulphate of soda solution. The iodine and bromine present being now known, the silver nitrate equivalents can be calculated and subtracted from the total halogen equivalent, and from this result the chlorine present is deduced.—Chem. News, Dec. 17, 1897, 293.

Chlorinated Lime—Inferiority of Package Samples.—L. A. Harding reports the result of examination of five samples of chlorinated lime purchased in the Minnesota market. Three of them were bulk samples, and came up fairly to the U. S. P. requirements, containing from 27.5 to 35.86 per cent. of available chlorine. The other samples were put up in small containers. One of them assayed less than 1 per cent., the other 2.16 per cent. of available chlorine.—Proc. Minn. Pharm. Assoc., 1897, 53.

Chlorinated Lime—Preservation in Zinc Containers Convenient for Sale.—At the meeting of the Pennsylvania Pharmaceutical Association, W. B. Thompson called attention to the apparent value of zinc containers for the preservation of chlorinated lime in hermetically sealed packages of convenient size for counter sales. He observes also that it has been demonstrated that the zinc container is not subject to corrosion by its contents, and that possibly other chemicals might be similarly preserved from change. In the discussion following, it was stated by several members that there is no difficulty to obtain bulk chlorinated lime of official quality; indeed, that much of it contains more than the required percentage of available chlorine. Therefore, assuming that the chlorinated lime is perfectly preserved in these containers, there is no excuse for inferiority when so supplied.—Proc. Penna. Pharm. Assoc., 1897, 83–86.

Chlorinated Lime—Commercial Quality.—Prof. Wm. A. Puchner reports upon the examination by some of his students of samples of chlorinated lime, the results again proving the inferiority of the article as supplied in sealed packages, while the bulk chlorinated lime uniformly showed a high percentage of available chlorine—in four samples, 34.15, 34.60, 35.27 and 31.50 per cent. respectively. Two of the samples put up in small containers showed only 23.65 and 23.30 per cent. of available chlorine, while four others were absolutely worthless, showing only 1.17, 0.36, 0.11 and

0.20 per cent. respectively. These results justify the demand made by regular consumers for chlorinated lime in bulk.—Proc. Ill. Pharm. Assoc., 1897, 70–71.

Chlorinated Lime—Available Chlorine in "Package" and "Bulk" Samples.—A. B. Stevens reviews some of the observations made during the past few years concerning the commercial character of chlorinated lime. He reports upon the results of his examination of 32 samples, which may be briefly given as follows. The first twenty-two samples were in packages, but of different brands. Ten of them, packed in metallic cans in the State of Michigan, gave 8.0 per cent., 2.0 per cent., 14.7 per cent., 7.7 per cent., 12.0 per cent., 5.8 per cent., 17.6 per cent., 1.8 per cent., 7.6 per cent., and 13.5 per cent. respectively of available chlorine—an average of 9.07 per cent.; five samples, all of one brand, also in metallic cans, gave respectively 14.3 per cent., 23.6 per cent., 31.3 per cent., 26.4 per cent., and 20.2 per cent. of available chlorine—an average of 26.16 per cent.; the other seven samples, all of one brand, but in pasteboard boxes, gave respectively 24.1 per cent., 14.1 per cent., 23.8 per cent., 20.5 per cent., 23.8 per cent., 26.8 per cent., and 27.3 per cent., an average of 22.9 per cent. of available chlorine. Six samples of "bulk" chlorinated lime gave 31.0 per cent., 16.5 per cent., 28.9 per cent., 19.3 per cent., 18.9 per cent., and 27.9 per cent. of available chlorine, an average of 23.75 per cent. The other four samples, one of which was a package sample, were inferior from evident causes, and are not therefore considered as fairly representing commercial samples. They contained from 0.4 to 1.7 per cent. of available chlorine. The author cautions against the practice of judging the quality of chlorinated lime by the odor, which is misleading, and mentions that he has known a partially filled jar, the contents of which contained only 2 per cent. of available chlorine to be accepted as good, by students who had rejected by this same test a number of packages containing 12 to 14 per cent.—Proc. Mich. State Pharm. Assoc., 1897, 42–45.

Potassium Chlorate—Use as a Tooth Powder.—Dr. Unna finds that a small quantity of potassium chlorate spread on the tooth-brush and rubbed on the gums, acts both as an antiseptic and as a deodorant, and strengthens the gums. Nothing so thoroughly removes *fetor oris*, even in cases which have been treated unsuccessfully with internal medicines, as does this simple remedy.—Pharm. Journ., Dec. 18, 1897, 543; from Brit. Jour. Dent. Soc. xl, *323*.

Bromine—Separation by Distillation from its Admixture with Alkaline Chloride.—H. Baubigny and P. Rivals observe that the decomposition of bromides by the action of a solution of copper sulphate and potassium permanganate does not permit us to collect the bromine or to determine it directly by diffusing when operating in a vacuum. It partly attacks the grease which serves as a luting. We can, therefore, know the weight, having previously determined that of the chlorine and the sum of the weights of the two elements. But every process of indirect determination is imperfect, especially when the body in question is the smaller in quantity. The authors have, therefore, sought to remove the bromine mechanically from the liquid, either by ebullition or by a current of air. The method of ebullition, in which the watery vapor formed has the object of expelling the free bromine, has also revealed the inconveniences involved. The first is the formation of enormous volumes of condensed water. Secondly, the ebullition causes rapid variations of the liquid volumes. Now the alkaline chlorides, stable at 100°, if the solution is not too strongly charged with salts of copper, are decomposed if the concentration exceeds certain limits. The use of a current of air, on the contrary, has permitted the easy solution of the question, and can be used at any temperature.—Chem. News, Nov. 12, 1897, 239; from Comptes Rendus, No. 15, Oct. 11, 1897.

Bromine—Detection by Means of Fluoresceine.—Baubigny has communicated a note on the use of fluoresceine for the detection of traces of bromine in a saline mixture. The bromine is set free by a mixture of potassium permanganate and copper sulphate, and the vapors evolved allowed to impinge upon fluoresceine paper. The presence of 1 milligramme of bromine in 10 grammes of common salt is shown by a reddish coloration of the paper due to the formation of eosin.—Chem. and Drugg., March 5, 1898, 400.

Pure Iodine—Preparation from Cuprous Iodide.—Bevan Lean and W. H. Whatmonch recommend a new process for the preparation of "pure" iodine, which is based upon the observation incidentally made that no iodine is set free when cuprous iodide is heated, even at its fusion-point, in a current of carbonic anhydride, although it is readily evolved when cuprous iodide is heated in air, oxygen, nitric oxide, or nitrogen peroxide. The action is represented by the equation $Cu_2I_2 + O_2 = 2CuO + I_2$. When a solution of cupric sulphate and a soluble chloride, bromide, or iodide is saturated with sulphurous acid, cuprous iodide, bromide, and chloride may all be precipitated; but there is so great a difference in their degree of solubility that, by securing a proper dilution, it is probable that cuprous iodide can be prepared free from cuprous bromide or chloride. A mixture of cupric sulphate and ferrous sulphate is still less liable to precipitate cuprous bromide and chloride along with cuprous iodide than cupric sulphate saturated with sulphurous acid. The authors have also found that cuprous iodide can be prepared by sprinkling iodoform in small quantities at a time upon a hot surface of copper. Furthermore, if the cuprous iodide is fused in a current of carbonic anhydride, or *in vacuo*, it can be freed completely from moisture.

Iodine is most conveniently prepared from cuprous iodide by heating it in a stream of dry air at 220° to 240° and condensing the vapors upon a cold surface. Although the greater portion of the iodine in a given quantity of cuprous iodide is quickly expelled, it is not easy to expel the whole;

after heating 1.7101 Gm. at 400° for eighteen hours, 0.15 per cent. of the iodide was still undecomposed—otherwise the relation $Cu_2I_2 : 2CuO$ could have been utilized for the exact measurement of the atomic weights of copper, iodine, and oxygen. Iodine liberated as described from cuprous iodide at 240°, leaves absolutely no residue when volatilized at 75°. If examined spectroscopically, no evidence of the presence of copper can be found. The melting-point (uncorrected) is 112.5° to 114°.—Chem. News, Feb. 4, 1898, 56.

Iodine—Paraldehyde a Delicate Reagent.—Wachhusen finds paraldehyde to be a delicate reagent for iodine. It is applied by adding a few drops of paraldehyde, without shaking, to a mixture of the solution supposed to contain an iodide with starch paste, when in presence of iodide, a reddish or blue color is developed at the line of contact of the two liquids. Or. the liquid to be tested may be shaken with some paraldehyde and then either mixed with starch paste, or shaken with carbon bisulphide to remove the iodine. In this way, iodine can be detected in solutions containing only 1 part in 500,000, or even in a million parts.—Pharm. Ztg., 1897, 95.

Iodine—Detection in Alkaline Chlorides and Bromides.—O. Wentzky says that when only traces of iodine are present in sodium chloride, sodium bromide, or potassium bromide, the reaction prescribed by the Germ. Pharm. with ferric chloride and starch, does not occur until after some time, while, if a few drops of dilute permanganate solution are added, the blue color will appear promptly. To 20 Cc. of a solution of sodium chloride, or to 5 Cc. of a 5 per cent. solution of sodium bromide, one drop of solution ferric chloride (Liq. ferri. chlor. 1, water 2), a few drops of freshly prepared starch solution, and then 1 Cc. of permanganate solution (1 : 100000) are added. If the color does not immediately appear, iodine is not present. By substituting dilute sulphuric acid for ferric chloride, still better results are obtained.—Apoth. Ztg.. 1898, 119.

Iodine—A Preservative of Meat.—According to Revel and Campagne, meat may be preserved perfectly by immersing it for about ten minutes in a solution of iodine and then letting it dry in the air. The meat, which keeps fresh for several days, will finally dry, and may then be kept for an indefinite period.—Pharm. Centralh., 1897, 230.

Potassium Iodide—Incompatibility with Strychnine in Mixtures.—J. Rutherford Hill calls attention to a prescription recently delivered to him by one of his associates, which, though written by an eminent physician, demonstrates the necessity for greater care in prescribing in the same mixture such well-known incompatibles as strychnine and potassium iodide. The components of this prescription were: Potassium iodide, 2 drachms; liquor strychninæ, 4 drachms; infus. quassiæ, sufficient to make 6 ounces. In a few minutes, particularly after shaking, an abundant separation of fine crystals of strychnine hydriodide followed—the character of the latter being determined by subsequent experiment. But the reaction did not cease here; for, though after six hours about five-sixths of the strychnine had deposited, after two days, owing to the decomposition of free hydriodic acid formed, reddish-brown columnar crystals, probably the strychnine tri-iodide of Bauer (see Proceedings, 1875, 419), began to separate. The addition of small quantities of alcohol diminished the amount of precipitate, but to prevent it entirely, even if this should prove to be possible, a quantity entirely too large to be admissible would have to be added.—Phar. Jour., April 23, 1898, 388.

Sodium Iodide.—Pharmacopœial Requirements.—John C. Umney calls attention to the fact that when sodium iodide is prepared according to the directions of the British Pharmacopœia it will probably consist of a mixture of anhydrous sodium iodide and sodium iodide with two molecules of water of crystallization, whereas the salt contemplated, to judge by the character and tests given, is one nearly anhydrous. The difficulties of obtaining an anhydrous or nearly anhydrous salt exist in the fact that the crystallization must be allowed to take place at 20° C. or upward, and this is in part at least recognized in the U. S. and in the German Pharmacopœias, which require the presence of at least 95 per cent. of anhydrous salt. A recent examination of sodium iodide prepared by the principal manufacturer, however, shows a still greater divergence. None of these samples contained more than 91 per cent. and some of them as little as 81 per cent. of anhydrous salt, a matter of considerable importance not alone from the stand-point of therapeutics, but also from that of commercial value. An inquiry into the practical possibility of obtaining a salt of greater strength than that now found in commerce should therefore be made, and the pharmacopœial requirements conformed to practical possibilities.—Pharm. Journ., Oct. 9, 1897, 317–318.

Fluorine—Liquefaction, etc.—In continuation of experiments previously recorded (see Proceedings, 1897, 596), M. Moissan and J. Dewar describe the nature of experiments made on the liquefaction of fluorine, its solidification, and to determine its properties, and they summarize their results as follows: Fluorine gas is easily liquefied at the temperature of boiling atmospheric air. The boiling point of liquid fluorine is —187°. It is soluble in all proportions in liquid oxygen and in liquid air. It does not solidify at —210°. The density is 1.94; its capillarity is less than that of liquid oxygen; it has no absorption spectrum, and it is not magnetic. Finally, at 210° it has no action on dry oxygen, water or mercury, but it reacts, with incandescence, on hydrogen and on oil of turpentine.—Chem. News, Oct. 22, 1897, 197–199; from Compt. rend., cxxv. (1897), No. 15, 505.

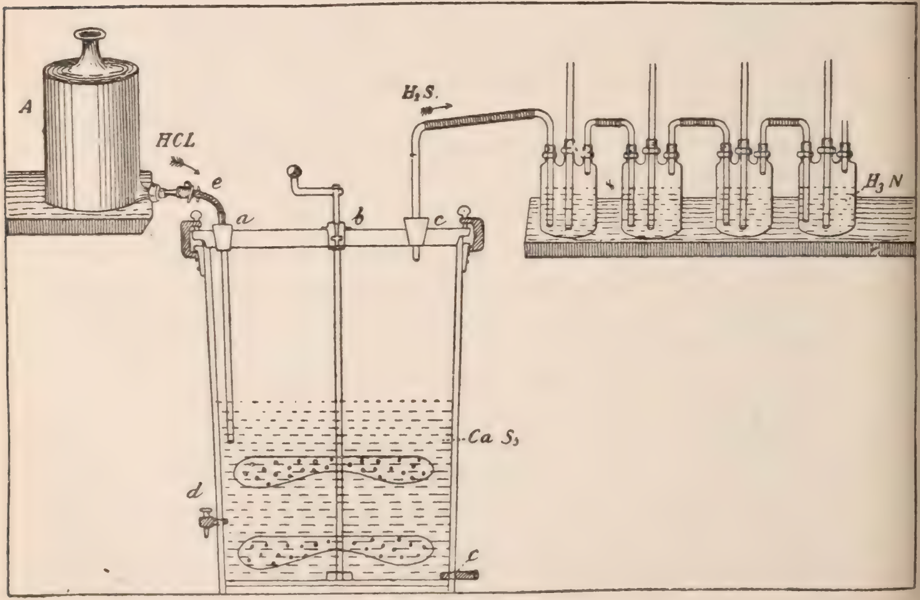
Ammonium Fluorboride and Ammonium Fluorsilicate—Therapeutic Uses.—F. Mohrhoff recommends the fluorboride and the fluorsilicate of ammonium as being effective inhalants in certain diseases. The fluorboride is stated to be an excellent antiseptic in nose and throat affections, whlie the fluorsilicate has been very efficient in the treatment of tuberculosis, diabetes and gout.—Pharm. Centralh., June 30, 1898, 476; from D. Med. Wochenschr., 1898, suppl., 44.

SULPHUR.

Sulphur—Statistics Concerning the Production in Sicily.—In a Consular Report, which is reproduced in "Amer. Jour. Pharm." (Aug., 1897, 420–423), U. S. Consul Chas. M. Cauchy, gives the statistics of the production, exports, stocks and prices of Sicilian sulphur for the years 1894, 95, 96, which will be found to be of special interest, in view of the fact that the Anglo-Sicilian sulphur trust is endeavoring to absorb the business, and that the United States import about 25 to 30 per cent. of the total production of Sicily. This amounts to from 100,000 to 125,000 tons; but the Consul thinks that this can be largely replaced by the use of pyrites for the manufacture of sulphuric acid, and that consequently the sulphur trust cannot succeed in maintaining the present high prices for any length of time.

Precipitated Sulphur—Apparatus for the Economical Preparation.—Moberger recommends the apparatus constructed as shown by Fig. 82, for the economical preparation of precipitated sulphur, ammonium sulphide being produced also as a by-product. The apparatus needs no explana-

FIG. 82.



Apparatus for the Preparation of Precipitated Sulphur.

tion. The process is controlled by occasionally removing a portion of the liquid in the precipitating vessel through *d*, to determine whether any undecomposed calcium sulphide remains. A mechanical stirrer is provided to facilitate the washing of the sulphur, the wash-water being withdrawn through *d*, and the washed sulphur, finally, with continual stirring, through *C*. The HCl is supplied from the vessel *A*, and the H_2S liberated during the process passes through a series of Woulff's flasks containing ammonia. —Pharm. Ztg., April 6, 1898, 288.

Precipitated Sulphur—Commercial Quality.—Frederick J. Wulling examined by pharmacopœial tests thirty samples of precipitated sulphur obtained from retail houses and five samples from wholesale houses in the representative cities of our country. Of the thirty samples, eighteen contained no calcium salt. Eight samples contained calcium, the majority being from western cities. Three gave faint reactions for arsenic; four responded to tests for selenium—two only feebly; and four gave acid reactions. One sample seemed to consist almost entirely of calcium sulphate. Of the five samples from wholesale houses, none contained calcium sulphate, though it must be stated that in at least three cases the purchaser had intimated the purpose for which the samples were bought. Of twenty other retail houses to whom calls were made for precipitated sulphur, five supplied washed sulphur under that name, and fifteen stated that the demand was so infrequent that it was not kept in stock.—Merck's Rep., Jan. 15, 1897, 38.

Precipitated Sulphur—Examination of Commercial Samples.—Prof. L. E. Sayre communicates the results of an examination of seventeen samples of precipitated sulphur obtained from different places in the West, made by S. N. Gray in the laboratory of the University (of Kansas?). There was a great difference in the color of the samples—from a grayish yellow to almost white—as also in the melting point, some of them refusing to melt when heated as high as 235° C. Only one of the samples could be considered a pure article; five others were fair samples, four of inferior quality, and all the others contained large quantities of calcium sulphate, varying in the seven samples from 46.65 per cent. to 61.87 per cent. Mr. Gray considers these results as evidence that, in general, sufficient care is not taken in the manufacture of precipitated sulphur.—Drugg. Circ., Nov., 1897, 318.

Sodium Sulphide—Estimation in its Admixture with Sodium Sulphydrate.—P. Dobriner and W. Schranz estimate sodium sulphide in the presence of sodium sulphydrate—such being considered a mixture of sodium sulphide and of free hydrogen sulphide—as follows:

Dissolve 12 Gm. of the substance to be analyzed in 1 liter of water, and allow about 25 Cc. of this solution to run, by means of a burette, into 45 Cc. of $\frac{1}{20}$ normal solution of iodine, previously acidulated with 10 Cc. of a normal solution of sulphuric acid, and diluted with water to form 180 Cc.

The yellow color of the solution should disappear. If the contrary is the case, the experiment must be repeated with a smaller proportion of the $\frac{1}{20}$ normal solution of iodine. After adding a little starch solution, we estimate by iodine solution the excess of hydrogen sulphide set at liberty. By multiplying the number of Cc. of iodine solution employed by 2, we obtain the percentage of sodium sulphide present in the substance: Let *a* be the percentage of ($Na_2S + 9H_2O$) found, then the total quantity of hydrogen sulphide obtained from the substance will be $\frac{34}{240}a$ per cent. H_2S.

On the other hand, dissolve 6 Gm. of the substance in water, treat the solution with an excess of normal sulphuric acid, boil to drive off the hydrogen sulphide, and titrate the excess of acid with a normal solution of caustic soda, using phenolphthalein as indicator. The difference between the total acid used and the acid remaining multiplied by 2, again gives the percentage of sodium sulphide present. The figure obtained corresponds with the hydrogen sulphide combined with the sodium. Let *b* be the percentage of ($Na_2S + 9H_2O$) found in the second operation, then the quantity of combined hydrogen sulphide will be $\frac{34}{240}b$ per cent. H_2S. The latter figure (*b*), deducted from that first obtained (*a*), gives the quantity of free hydrogen sulphide in the sample.—Chem. News, March 11, 1898, 108; from Zeit. f. Angew. Chem., 1897, 455.

C. P. Hydrogen Sulphide—Preparation.—Josef R. Michler obtains chemically pure hydrogen sulphide from a concentrated solution of calcium sulphydrate by the action of hydrochloric acid. The solution, of a strength of 19° to 20° B., is placed into a flask provided with a funnel-tube and an exit-tube leading into a wash-bottle, from which the gas may be drawn in the usual manner. The gas is completely free from arsenic, with which it is liable to be contaminated when made from ferrous sulphide, and is in all respects chemically pure.—Pharm. Centralh. Nov. 25, 1897, 801.

Acidum Sulphurosum, U. S. P.—Precautions in Preparation.—F. E. Harkins states that in preparing the official solution of sulphurous acid, it is well to follow the pharmacopœial directions implicitly. The precautions necessary are that only a small quantity of water be used to wash the gas, and that the temperature of the receiver be kept low by immersion in a cooling mixture. The charcoal, also, should not be broken up too fine, lest it form cakes, adhere to the sides of the flask, and cause its fracture. The estimation of the strength of the solution is simple and convenient.—Merck's Rep., Febr. 1, 1898, 72.

Sulphurous Acid—Analytical Application of Its Reduction to Hydrogen Sulphide.—Hot solutions of stannous chloride and sulphurous acid decompose, forming hydrogen sulphide, which is, however, usually transformed into sulphur by the continued action of the SO_2, the reaction probably occurring as follows: $3SnCl_2+SO_2+6HCl=3SnCl_4+2H_2O+H_2S$. A writer in "Chem. Ztg" (Repert.) xxi, 322, suggests that the reaction is of practical use in separating small quantities of arsenic and antimony from a large excess of tin. See under "Arsenic."

Sulphurous Acid—A Perfumed Alcoholic Solution as a Disinfectant.—Gawolowski recommends as a disinfectant an alcoholic solution of sulphurous acid gas, saturated at a low temperature, to which thymol and a suitable perfume is then added. Such a disinfectant would remove the inconvenience suffered by travellers through the disinfecting process commonly employed at quarantine stations.—Pharm. Centralh., xxxviii., 424.

Sodium Sulphite and Bisulphite—Commercial Quality.—Prof. W. A. Puckner reports upon the examination of commercial samples of sodium sulphite and bisulphite carried out by his students. A sample of bisulphite containing chloride and sulphite in excessive amount gave off a quantity of sulphurous oxide equivalent to 65.15 per cent of pure salt. Another sample contained excessive chloride, 49.5 per cent. of sulphate, and only 41.9 per cent. of bisulphite; while a third sample contained hyposulphite, excess of chloride, 15.3 per cent. sulphate and 75.4 per cent. bisulphite. Four samples of the sulphite were examined. None of them came up to the pharmacopœial standard—96 per cent. or more of pure crystallized sulphide—the percentage found being 74.02, 53.91, 66.65, and 92.52 per cent. The only impurities found were sulphate amounting in the same order to 14.52, 20.31, 17.5, and 2.5 per cent. respectively.—Proc. Ill. Pharm. Assoc., 1897, 72–73.

Sulphuric Acid—Reduction to Sulphurous Acid by Hydrogen.—P. E. Bertholet states that when hydrogen and sulphuric acid are exposed to a temperature of 253° C. in a sealed tube for six hours, the whole of the hydrogen is absorbed, with the production of water and sulphurous acid. At ordinary temperatures a slow current of hydrogen passed over sulphuric acid does not form enough sulphurous acid in one hour to be determined. If, however, the contact be prolonged, as in a sealed tube, considerable reduction of the sulphuric acid by the hydrogen is brought about. Thus in two months 75 per cent. of the hydrogen contained in such a tube with sulphuric acid, kept at normal temperatures ranging from 19° to 27° C., was converted into water with a corresponding reduction of the acid. Light did not appear to influence the result, nor did the presence of oxygen, although a portion of that gas was used up in reoxidizing the sulphurous acid formed. Dilute sulphuric acid, sulphurous and nitric acids are not acted upon by hydrogen under similar conditions.—Pharm. Journ., Feb. 12, 1898, 139; from Comptes rendus, cxxv., 743.

Sulphuric Acid—Volumetric Estimation as Sulphates in Potable Waters.—Felix Marboutin recommends the following volumetric method for estimating combined sulphuric acid in potable waters: 100 Cc. of the water are acidulated with hydrochloric acid, and boiled to drive off the carbonic acid; the temperature is then slightly lowered, and 30 Cc. of barium chloride are added, drop by drop; then let stand at 40° to settle; it is then neutralized with a few drops of ammonia, and 30 Cc. of potassium chromate added; the liquid is made up to 300 Cc. after cooling. To 100 Cc. of the clear liquid are added 2 Cc. of 25 per cent. sulphuric acid and 5 Cc. of arsenious acid; it is then warmed and shaken till the color disappears. After neutralizing with potassium carbonate, titrated iodine is added until starch is colored. This method has the advantage of requiring no filtration or washings, and it takes into account any impurities in the reagents, and they need not, except the iodine, be very carefully titrated beforehand.—Chem. News, Jan. 28, 1898, 46; from Bull. Soc. Chim., No. 22, 1897.

Sulphurous Acid—Test for Its Presence.—H. Jervis observes that in reducing ferric solutions with sulphurous acid the sense of smell does not indicate the absence of SO_2 with sufficient delicacy; it is prone to be biased by colds in the head and other physiological derangements. To boil for an inordinate length of time after this test has given negative results, so as to make sure, is rather rule-o'-thumb. Because it is easy to apply, the author proposes, instead of a Bunsen valve and other like contrivances, that through the hole of the stopper which closes the mouth of the flask there be inserted the short end of a syphon-like tube; as soon as the evolution of SO_2 becomes faint, the other end drawn out is dipped into an acid solution of very dilute permanganate. A decolorization which gives place to a brown precipitate is not to be regarded, but the complete clearing of the solution indicates SO_2. This test, on account of the large volume of vapour condensed, shows SO_2 after the sharpest noses have failed to detect it. The solution may be conveniently cooled and diluted by dipping the tip of the leg into cold water.—Chem. News, March 25, 1898, 133.

Sulphuric Acid.—Action upon strychnine in toxicological determinations. See *strychnine* under "Organic Chemistry."

SELENIUM.

Selenium—Use for Coloring Glass.—According to "Scientific American" (Suppl.) selenium has recently been utilized by glass workers for producing colored glass. Rose tinted glass is produced by selenium alone, the depth of tint depending on the quantity used. A lovely orange is produced by a mixture of selenium and cadmium sulphides, the intensity of the yellow being varied by the quantity of the cadmium salt. A practical advantage in the use of selenium is the avoidance of reheating necessary in the ordinary methods of making red glass.—Merck's Rep., Feb. 15, 1898, 114.

PHOSPHORUS.

Liquid Phosphorus—Question of Existence.—In 1875 Hourton and Thompson reported the formation of a peculiar modification of phosphorus formed on boiling ordinary phosphorus for five minutes with a strong solution of potash. The alkaline solution was poured off and the liquid phosphorus washed. It is said to remain liquid for months and solidifies only on cooling to +3.3°. It is further reported as not oxidizing in the air, nor giving off light in the dark. On becoming solid, it forms ordinary wax-light phosphorus and a second variety of crystalline phosphorus. F. P. Venable and A. W. Belden have now made some experiments, the details of which are given, and in which they followed the directions outlined above, but failed under any conditions to obtain a liquid phosphorus. It is true that the phosphorus becomes liquid on heating under the alkaline solution, and if left covered with the same, stays liquid a long time, solidifying only when strongly cooled. It seems to give off occasional bubbles of gas during this standing, and is probably being slowly changed into phosphine at ordinary temperatures. The authors are at a loss to know how the authors mentioned above secured their liquid phosphorus, and how it could prove unalterable in the air. In all of their experiments it was peculiarly inflammable.—Pharm. Era, April 14, 1898, 544; from Journ. Amer. Chem. Soc.

Phosphorus—Determination in Phosphorated Oil.—Seyda recommends the following method of determining the amount of active phosphorus in phosphorated oil; Thirty drops of the oil are placed in a Kjeldahl flask, and 20 Cc. of fuming nitric acid added very gradually to it through a tapped funnel. When action has moderated, the flask is cooled, then heated on the water-bath for an hour. The greater part of the nitric acid is then driven off by heating the flask over a naked flame; the residue is treated with hot water, transferred to a platinum dish, and evaporated to dryness. The solid residue so obtained containing some free fatty acids is treated with 3 Gm. of sodium carbonate, and 1 Gm. of potassium nitrate and a little water; the solution is again evaporated, and the residue burnt to an ash, calcination being aided by the addition of a little nitre. The ash so obtained is dissolved in water and a slight excess of hydrochloric acid, and heated until all carbonates and nitrates are decomposed. The phosphoric acid is then precipitated by the molybdic method, and the phosphomolybdic precipitate collected, dried and weighed. It is dissolved in ammonia, and the amount of phosphoric acid contained in it determined by precipitation in the usual way by the magnesium method.—Pharm. Journ., Oct. 2, 1897, 298; from Pharm. Zeit. für. Russ., xxxvi., 337.

Phosphorus Iodides—Formation and Character.—Barron obtained phosphorus tri-iodide, PI_3, in a pure condition in dark-red crystals, by acting on a solution of phosphorus trichloride in carbon tetrachloride with hydriodic acid.

Phosphorus Tri-iodide melts at 61° C, and is entirely decomposed by water, without liberating any free iodine or forming a deposit. Its solution in carbon disulphide is reduced by mercury, first into P_2I_4, then with excess of mercury entirely, mercurous iodide and double iodide of mercury and phosphorus being formed. By acting upon PI_3 with silver it is reduced to

Phosphorus Di-iodide, P_2I_4, without any further reduction. This melts at 110° C., undergoing slight decomposition, and under reduced pressure it is dissociated between 100° and 120° into the tri-iodide and into amorphous phosphorus.—Pharm. Journ., July 31, 1897, 81; from Compt. rend., cxxiv, 1347.

Hypophosphites—Improvement of the Qualitative Tests of the B. P.—Charles T. Tyser communicates the results of a critical examination of the qualitative tests of the British Pharmacopœia for the various official hypophosphites, and finds that in all cases the tests of the U. S. P. are more comprehensive and better than the B. P. The barium chloride precipitate in cold solution comprehends all impurities likely to be present. This precipitate includes phosphate, phosphite, sulphate, and rarely sulphite. An average commercially pure sample will contain phosphite as its greatest impurity, it being on a manufacturing scale impossible to elude this. To differentiate between the barium chloride precipitates he uses the following methods:

(1) To a portion of a hypophosphite solution add magnesium test solution: *phosphate* is precipitated.

(2) Add barium chloride, acidulated with HCl, then boil for two minutes, add dilute nitric acid and boil: *sulphate* remains as residue.

(3) Add barium chloride to the neutral solution of the hypophosphite, collect the precipitate and wash, scrape the precipitate off the filter paper, and place in a test tube with 5 Cc. of water. To a portion of this precipitate add some pure granulated zinc, then hydrochloric acid, and boil, suspending some lead acetate paper in the mouth of the tube: *sulphite* to the amount of as little as .01 is indicated by discoloration of the paper.

(4) Heat another portion of the precipitate obtained as above to boiling, add 3 Cc. of hydrochloric acid, continue boiling for one minute, when all SO_2 will be driven off if the sulphite is present without having time to act on phosphite. Then add granulated zinc, when *phosphite* will be indicated by action of PH_3 or silver nitrate paper. As a precaution against the presence of H_2S, a piece of lead acetate paper should also be suspended along with the silver nitrate paper. Coming to individual salts,

Calcium Hypophosphite.—The solubility is 7.2 at 15° C., and commercial samples are not completely and clearly soluble under this. The B. P. ignition test gives an incorrect impression. Hydrogen as well as PH_3 are evolved. A slight latitude should be allowed in the presence of precipitate by barium chloride—say 0.2 to 0.3 per cent.

Sodium and Potassium Hypophosphites.—The U. S. P. tests for detection of potassium in the sodium salt should be included in the B. P. The same latitude with regard to $BaCl_2$ precipitant should be allowed as in the calcium salt. Indeed, the U. S. P. gives a latitude of 2.04 per cent. in the sodium salt, and 1.3 per cent. in the potassium salt, more phosphate being usually found in the sodium salt than in the other. A trace of carbonate is always, and should be always, present for two reasons. First, to insure the complete absence of calcium, the latter being more soluble than is generally supposed; and secondly, to prevent generation of the odor on keeping. This has been found a very effective preventative to decomposition. Under these circumstances, if the salts are kept hermetically sealed and free from any contact with moisture, atmospheric or otherwise, no gaseous reduction products result.

Barium Hypophosphite.—This salt, if completely soluble and neutral, would generally be found pure. It should be neutral. If alkaline, barium hydrate may be present and will deposit on boiling; if acid, acid phosphate of barium may be present, or acid hypophosphite, in which case it is particularly liable to gaseous reduction products on keeping. One point of particular importance is the testing for nitrates, which can be carried out by the usual iron sulphate test. The presence of nitrates may be due to use, in its manufacture, of imperfectly-prepared barium hydrate, which is usually made from the nitrate of barium. Mixtures of barium nitrate and barium hypophosphite are particularly explosive.

Iron Hypophosphite.—The extended use of this article warrants its inclusion in the B. P. That according to the U. S. P., tests should be insisted upon. This is the ferric hypophosphite. The commercial article is unsatisfactory. It is often chosen on account of whiteness, regardless of chemical composition. It is generally a mixture of ferrous and ferric hypophosphite. Further, the whiteness cannot satisfactorily be retained and lime be absent unless sulphate is present. It is not very soluble in hypophosphorous acid and potassium citrate neutral solution. The ferric salt, however, can be made perfectly soluble in these solvents. Latitude should be allowed in the presence of chlorides, as from its manufacture and peculiar property when freshly precipitated, forming a solid mass, it cannot be quite free. Complete solubility and its freedom from excess of chloride, sulphates and phosphates are the chief points in testing. It is not, as U. S. P. states, quite stable in the air, being slightly deliquescent, and when damp, liable to formation of phosphate when in contact with the air, and somewhat sensitive to the action of light, like most of the metallic hypophosphites.

Hypophosphorous Acid.—This article is used as a reducing agent in analysis as well as in pharmacy. It should be of a special purity as regards the presence of dissolved salts. Barium hypophosphite is a possible impurity. The slight solubility of barium hypophosphite in hypophosphorous acid renders the presence of a trace of sulphuric acid desirable. There should not be more than a slight residue left upon evaporation and ignition in a porcelain crucible. The presence of excessive quantities of silica due to evaporation in bad porcelain is indicated by diluting the acid with nine times its volume of water and standing for twenty-four hours, when any appreciable quantity of silica will separate out. Nitrate should be tested for as in the barium hypophosphite. The acid should not darken with H_2S, and it should be free from odor and colorless. The specific gravity should be 1137, corresponding to 30 per cent. of the acid.

Arsenic should be tested for in all hypophosphites, being a possible impurity in badly refined phosphorus.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy) 1897, 398–405.

Calcium Hypophosphite—Solubility of Commercial Samples.—In response to a query, R. S. Vill has examined four samples of calcium hypophosphite obtained from representative manufacturers and found each one to conform very nearly to the U. S. P. requirements of solubility, viz., in 6.8 parts of water at 15° C. Their solubility under the conditions named was found to be in 6.95, 6.9, 6.92 and 6.91 parts of water respectively.—Proc. Mo. Pharm. Assoc. 1897, 70.

Phosphoric Acid—Estimation.—In 1889, Henri Lasne made some experiments on the estimation of phosphoric acid by which he had shown: (1) that the precipitate of ammonio-magnesium phosphate gives rise to no loss when carried out in the presence of ammonium citrate and a sufficient excess of magnesia; (2) that the lime, iron oxide, alumina and manganese are not carried down by the precipitate; (3) that the presence of silica and of fluorsilicates causes an excess; and (4) that without the addition of an excess of magnesia, the precipitation is not complete, and the filtrate will give a precipitate either with magnesia or with phosphoric acid. These results have been recently confirmed, and they demonstrate that, starting with the ammonio-magnesium phosphate, this compound can be reproduced without any loss whatever; after calcining, we obtain exactly the same weight. But here the question arises, has this calcined body the theoretical composition of the pyrophosphate? Nothing seems to prove it, since the sample under analysis was obtained under exactly the same conditions as a final precipitate. Some doubts had arisen on this subject—doubts which have since been shown to be unfounded—on which account the experiments detailed in the author's present paper were undertaken. The results of these lead to the following conclusions:

1. The estimation of phosphoric acid, in the state of pyrophosphate, without any precautions beyond the preliminary elimination of the silica, gives trustworthy results, untainted by systematic errors.

2. Rapid precipitations cause an excess, due to the partial formation of trimagnesic phosphate, which is only transformed into ammonio-magnesic phosphate after sixteen hours contact with sufficiently concentrated citrate of ammonia (10 Gm. of citric acid to 150 Cc. of solution). It therefore follows, that to obtain satisfactory results the solution should be allowed to stand all night.

3. In spite of all this, the excess is sufficiently small as not to completely condemn these rapid methods, which can with advantage be used commercially, if due notice is given that this is being done.

4. The transformation of the trimagnesic phosphate into ammonio-magnesic phosphate is very slow in the presence of ammonium chloride only, and it should always be remembered to add the necessary quantity of citrate.

5. The precipitation of the magnesia in the presence of an excess of ammoniacal phosphate gives, at the same time, with the ammonio-magnesic phosphate another phosphate, not only poorer in magnesia, but also poorer as the excess of phosphoric acid present is greater. The estimation of the magnesia by this almost classic method is, therefore, always erroneous.—Chem. News, Dec. 3, 1897, 268–271; from Bull. Soc. Chim., 1897, Nos. 16 and 17.

Phosphoric Acid—Determination as Ammonium Phosphomolybdate.—Thomas S. Gladding observes that, while the estimation of phosphoric acid by weighing the yellow precipitate of ammonium phosphomolybdate has often been attempted, it has hitherto not been successful, except in iron analyses, where the amount of phosphorus is very small. He now finds that the following method of procedure gives a precipitate of a very uniform composition and will probably afford the simplest and easiest method yet presented for estimating phosphoric acid: To the solution of phosphoric acid (25 Cc. to 50 Cc. in bulk) are added 25 Cc. of strong ammonia, 0.900 sp. gr.; nitric acid, 1.42 sp. gr., is now added to acidity. The beaker containing the solution is placed in a water-bath maintained at a constant temperature of 50° C. The ordinary five per cent. acid molybdate solution is now added from a burette at the rate of about 3 drops per second, with constant stirring (50 Cc. may be added in five minutes). When the molybdate solution to an excess of about 10 Cc. has been added, the beaker is allowed to remain for ten minutes in the bath. The contents are then filtered through a weighed filtered paper. The filtrate, without the washings, and after the addition of 5 Cc. molybdate solution, is replaced in the bath for ten minutes. The liquid should remain clear, or at most show only a faint opalescence. For washing the precipitate, a wash-water of dilute nitric acid, 1 : 100, is employed. Three generous washings by decantation and three washings on the paper, followed by one final washing with distilled water, are sufficient. The paper and contents are now drained for a few minutes on some waste filter or blotting paper, and then dried to a constant weight at a temperature of 105° C.—Chem. News, Jan. 21, 1898, 32, 33; from Amer. Fertilizer.

Dicalcium Phosphate—Preparation.—A. Barille proposes the following formula for preparing dibasic calcium phosphates: Triturate one kilo of powdered, white, burned bone with warm water until a homogeneous paste is obtained, to which add 1.454 kilos of hydrochloric acid of a specific gravity of 1.17 in divided portions. When the reaction has ceased, dilute with about three liters of warm water, filter, and when the salt has dissolved fill up to 10 liters with water and then add 442 Gm. of ammonia previously diluted with 20 times its own volume of water. The liquid left standing above the dicalcium phosphate must remain slightly acid at the end of the reaction, and should give only a slight cloudiness upon the addition of a few drops of ammonia. Collect the precipitate on a cloth and wash it with water until the washings acidulated with nitric acid cease to be clouded by the addition of silver nitrate. Finally dry rapidly at a temperature of 60 degrees C. The preparation thus obtained is a white, shiny, very light powder crystallizing in hexagonal scales and showing no trace of tricalcium phosphate or of any amorphous substance under the microscope.—Amer. Drugg., Jan. 25, 1898, 35; from Rep. de Pharm., 1897, 529.

Calcium Phosphate, Precipitated.—Presence of Carbonates.—Charles H. LaWall calls attention to several large consignments of precipitated calcium phosphate which were found to contain a great quantity of carbonate—in one case as much as 40 per cent. He calls attention to the necessity of the personal examination of goods by each druggist, so clearly demonstrated in this case; for the use of such a product in the preparation of tinctures of opium by the formula of the Pharm. 1890, would result in the retention of the morphine and the consequent worthlessness of the preparation.—Amer. Journ. Pharm., Dec., 1897, 621.

Scaled Iron Phosphate—Advantageous Method of Solution.—Thos. W. Murphy observes that in making solution of scaled iron phosphate, the operation is greatly facilitated by heating the water, pouring it into a mortar, and adding the salt gradually with constant stirring. The salt should *not* be powdered. The same rule applies to all scaled preparations. Heating the scale salt with the water is not near so effective.—Merck's Rep., Jan. 15, 1897, 38.

SILICON.

Silicates—Obviation of Gelatinous Hydrate in Analysis.—According to Le Claire the difficulty in the analysis of silicates from formation of the gelatinous hydrated silica, may be obviated by the following process: The finely pulverized silicate is mixed with three times its weight of red lead, or less, if alkalies are present, and heated to orange-redness in a muffle for thirty minutes. A liquid glaze is thus obtained, which solidifies on quickly cooling and is detached from the sides of the crucible. This is then decomposed with six times its weight of a mixture of ordinary and of fuming nitric acid, heated to about 40° C., the result being lead nitrate and silica. When decomposition is complete, the liquid is treated with boiling water, the silica thrown on a filter, washed until free from lead, calcined and weighed. To obtain the lead oxide suitable for the purpose a 15 per cent. solution of lead nitrate is precipitated with oxalic acid, the precipitate is collected, dried and calcined below a low red heat. A portion is removed, moistened with nitric acid, mixed with the rest, and again calcined. The resulting oxide is in an extremely minute state of division.—Pharm. Jour., May 21, 1898, 488; from Comptes rendus, cxxv., 893.

Pumice Stone—Advantageous Use as a Filtering Medium.—Busch recommends finely powdered pumice stone as a filtering medium for liquids containing minutely distributed precipitates—such as barium or lead sulphate—which are prone to pass through an ordinary filter. Two or three grains of the very fine pumice powder, which must have been previously freed from all acid soluble impurities, are placed in the point of the filter, when, after the passage of the first few drops, a clear filtrate is readily obtained.—Pharm. Centralh.

Asbestos—Sources and Varieties.—According to "Scientific American" (Suppl.), the French manufacturers of asbestos goods are supplied from four sources: (1) Canada, whence the asbestos is white, silky, very unctuous, having supple fibres from 5 to 25 Mm. in length, and the best variety for spinning; (2) Siberia, whence comes a yellowish variety, with less flexible fibre than the Canadian, and more woody and dry, but stronger. (3) The Cape of Good Hope, which supplies an asbestos of a characteristic blue color, in larger pieces and stronger in fibre, but more difficult to spin and manipulate than the preceding, and a good deal reduced to powder. (4) Italy supplies different kinds, some long and silky, others of short fibre, but generally not adapted to spinning.—Merck's Rep., Dec. 15, 1897, 763.

Soap Stone—Use as Emulsifier.—Lahache calls attention to an argillaceous earth named "Tfol," which contains free gelatinous silica, and is largely used by the Arabs in Northern Africa as a substitute for soap in washing linen. He finds that it has great capabilities of absorbing oil, 1 part of this substance completely absorbing 5 parts of heavy tar oil. When the compound is mixed with water a perfect emulsion is formed, which does not adhere to the sides of the vessel. It is proposed to employ this earth for the purpose of emulsifying heavy tar oil for disinfecting purposes. For this purpose the "tfol" is first mixed with an equal weight of water, and then intimately incorporated with sufficient heavy tar oil to make a paste.—Pharm. Journ., Mar. 5, 1898, 328; from Journ. de Pharm. [5], vi., 58.

BORON.

Boron—Re-Determination of Atomic Weight.—F. B. Armitage observes that the uncertainty of the method of determining the atomic weight of boron, which is based on the determination of water of crystallization in borax, is due to the difficulty of obtaining the borax dry without losing water by efflorescence. He therefore carried out the process as follows: The re-crystallized borax, in a finely-divided state, was washed with alcohol, the alcohol being removed by ether, and the ether in its turn by evacuating with the Sprengel pump, admitting air and evacuating a second time. About 2 Gm. were placed in a platinum crucible provided with a perforated lid; this was placed in a test-tube, which was heated in an air-bath at 90° for four hours; the temperature was then slowly raised and kept an hour at 200°; it was then heated for three hours at 400°. Being now heated over a Bunsen burner there was no intumescence, and hence no loss by decrepitation. If heated over the blow-pipe it was found that the borax continually lost weight, while a sublimate appeared on the crucible lid; so the use of the blow-pipe was discarded, the crucible being heated over the Bunsen burner instead, until the weight became constant, a condition always attained in three-quarters of an hour. As the mean of several experiments, the number chosen by the author for the atomic weight of boron was 10.959. The number previously published by Professor Ramsay is 10.966.—Pharm. Journ., Feb. 12, 1898, 146; from Proc. Chem. Soc., Feb. 3, 1898.

Borides of Calcium, Strontium and Barium—Successful Preparation and Characters.—Moissan and Williams have succeeded in effecting the combination of calcium, strontium and barium with boron by means of the electric furnace, a mixture of the borates of the respective alkaline earths, pure and dry, of aluminium turnings, and of sugar charcoal, being fused together in a carbon crucible. The fused button of

Calcium Boride so obtained has a crystalline fracture and a metallic appearance. After purification, the boride obtained is a brilliant black micro-crystalline powder, composed of minute rectangular or cubical crystals, which are transparent and yellowish in color when very thin. The hardness is sufficient to scratch rubies. Although not yet isolated in a state of absolute purity, the formula CaB_6 is indicated.

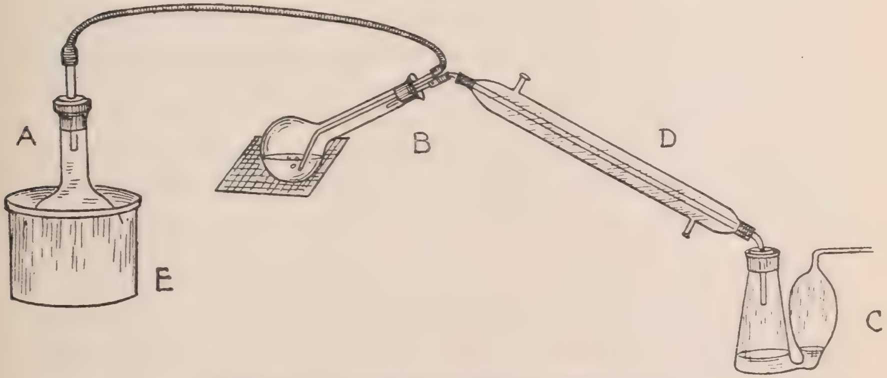
Strontium Boride, when purified, is obtained like the calcium compound in the form of a micro-crystalline powder, but the component crystals are larger than those of calcium boride, and when thin, of a reddish-brown color. The analysis approximates to the formula SrB_6.

Barium Boride is obtained in a form similar to the two borides before mentioned, and the crystals, although small, are very regular and sufficiently hard to scratch rubies, but not diamonds. The chemical properties of this are similar to those of the other borides, and the formula BaB_6

approximates to the analytical figures obtained.—Pharm. Jour., Nov. 27, 1897, 458; from Compt. rend., cxxv., 629–634.

Boric Acid—Estimation.—Dr. Thomas S. Gladding describes a process for the estimation of boric acid, which is based upon its volatilization in a current of methyl alcohol vapor. The apparatus required is shown in the accompanying cut (Fig. 83). Into a flask, *B*, resting on a wire screen, over a Bunsen burner, 1 Gm. of the substance to be examined is placed, together with a little 95 per cent. methyl alcohol and 5 Cc. of syrupy phosphoric acid. Flask *A* is filled two thirds full of methyl alcohol and placed in the water-bath *E*. Flask *B* is connected with condenser *D*, and flask *C* placed in position to receive distillate. Heat is now applied to water-bath *E*, and when the methyl alcohol boils, flask *A* is connected with the tube which passes into the flask *B*, as shown. A current of methyl alcohol vapor is thus kept passing through the substance in flask *B*, which dissolves and carries over the boric acid. By suitably regulating the heat under flask *B*, the volume of liquid in this flask must be maintained between 15 and 25 Cc. The distillation is continued until about 100 Cc. have collected in the receiver. A mixture of glycerin, 40 Cc. and water, 100 Cc., carefully neutralized, with phenolphthalein as indicator, is now added to the distillate, and the mixture is then titrated with standard soda. The results are unusually good. In examples, 36.57 per cent. of boric acid was determined in borax, which theoretically contains 36.65 per cent., while boric acid itself gave 99.9 per cent. by this process.—Amer. Drugg., Feb. 10, 1898, 69; from Proc. Am. Chem. Soc., Feb. 4, 1898.

FIG. 83.



Apparatus for the Estimation of Boric Acid.

Boric Acid and Borax—Effects on Nutrition.—In view of the extensive use of borax and boric acid as food preservatives in recent times, Dr. R. H. Chittenden has undertaken a series of experiments upon dogs with the view to determine the effects of these agents, when administered with food, upon the process of nutrition. The results obtained clearly indicate that moderate amounts of borax exert no measurable influence upon the metabolism of proteid matter. Dogs weighing ten to twelve kilogrammes were apparently unaffected by daily doses of two to five grammes of borax, mixed with their food. With larger doses, however, positive evidence of physiological disturbance was found. Boric acid, also, in doses up to three grammes a day, appears to be without influence either upon proteid metabolism or upon the general nutritive processes of the body. It likewise has a less disturbing effect than borax upon the assimilation of proteid and fatty matter in the gastro-intestinal tract. Like borax, however, increase of dosage to 1.5 to 2.0 per cent. of the daily food is liable to produce nausea and vomiting. Both borax and boric acid are without influence upon the putrefactive processes of the intestines, apparently because of the rapid absorption from the intestinal tract and quick elimination through the urine.—Pharm. Era, March 10, 1898, 352; from N. Y. Med. Journ.

Borates of Lithium—Formation and Character.—Chartelier finds that fused boric acid forms with lithium carbonate monobasic lithium borate, $Li_2B_2O_4$, as sodium does. On treating this with water a hydrated salt, containing 16 mol. of H_2O is formed, which crystallizes in fine rhombohedric crystals; but on treating an aqueous solution of boric acid with lithium carbonate, the tetraborate, similar to borax, is formed, but is so soluble that the author could not obtain it in crystalline form. Calorimetric determinations show that this salt closely resembles the similar sodium salt. —Pharm. Journ., July 31, 1897, 81; from Compt. rend., cxxiv, 1093.

Sulphoboric Acid—A New Compound.—De Gatschkouski has introduced a new compound, sulphoboric acid, which is said to be made as follows: 150 Gm. of sulphuric acid are poured, as slowly as possible, and with constant stirring, on 150 Gm. of pure boric acid. The paste thus formed is left at rest for two or three days, when it becomes as hard as stone. It is then broken up, crushed, and triturated, with the slow and continuous addition of 450 Gm. of sulphuric acid, when a milky liquid is obtained, which is then heated until it becomes clear. The new compound is said to have all the properties of sulphuric acid, but its action is slower, and there is no danger attending its use. It may be used with advantage for a variety of purposes, for instance in electric piles, in accumulators for making nitric acid, etc.—Merck's Rep., Sept. 1, 1897, 541; from Bull. Com., xxv., 283.

CARBON.

Diamonds—Successful Production by a New Process.—Dr. Quirino Majorana has succeeded in producing diamonds artificially by a process which consists in heating a piece of carbon by an electric arc, and then subjecting it to a violent pressure by means of a small plunger actuated by a piston, on which a pressure of five thousand atmospheres is suddenly developed by explosion. When a sufficiently strong cylinder had been constructed to withstand this enormous pressure the experiment resulted in the production of a black mass, consisting largely of graphite and amorphous carbon. By employing Bertholet's method to isolate the diamonds if they existed, small microscopic crystals were obtained, mostly black and opaque, but exhibiting all the properties of true diamonds. The author draws the conclusion from these experiments that pressure and heat alone are sufficient to transform amorphous carbon into the crystalline or diamond form, and that the presence of a metallic solvent, as in Moissan's experiment, is not essential to the transformation.—Pharm. Journ., Oct. 2, 1897, 300; from Nature, lvi, 500.

Animal Charcoal—Oxidizing Power.—It is stated by Dupuy that the addition of a few grains of animal charcoal to a few cubic centimeters of fresh tincture of guaiacum immediately causes the development of a blue color in the cold, while wood charcoal does not give this reaction. He therefore considers it probable that the beneficial effect of animal charcoal on ulcerations and granular wounds is due to the oxidizing power.—Pharm. Journ., Aug. 28, 1897, 190; from Bull. de la Soc. de Pharm. de Bordeaux, xxxvii., 171.

Carbides—New Method of Preparation by the Action of Calcium Carbide on Metallic Oxides.—Henri Moissan states that besides its curious action on water, carbide of calcium acts as a powerful reducing agent, and, thanks to this property, can furnish a number of new compounds by double reaction, but only when in contact with the body in a liquid state, or a state of fusion at a sufficiently high temperature. In a state of fusion it acts energetically on the oxides, and if the metal will not unite with carbon—such as lead, tin, and bismuth—it is set at liberty, and can be separated or combined with other bodies, according to the condition of the experiment. If the metal or metalloid is capable of being carburized, a double decomposition takes place, according to the formula—

$$RO + CaC_2 = RnC + CaO,$$

in which R represents the metal and n a variable number of atoms of carbon. By this method definite crystallized carbides of aluminium, manganese, chromium, molybdenum, silicon, etc., have been prepared.—Chem. News, Jan. 7, 1898, 11; from Compt. rend., Nov. 22, 1897.

Carbides—Preparation.—According to Moissan, when calcium carbide in the state of fusion in the electric furnace is brought into contact with metallic oxides, either double decomposition results, carbides and oxides of the respective metals being formed, as is the case with aluminium, manganese, chromium, molybdenum, titanium, and silicon, or the metallic oxide is reduced and forms a button of pure metal, as is the case with lead, bismuth and tin. The author remarks incidentally that the formation of

Silicon' Carbide or carborundum may have an important practical bearing. The crystals of this substance obtained were well formed, characteristic and colorless, or with a faint bluish tint.—Pharm. Journ., Feb. 12, 1898, 139; from Compt. rend. cxxv, 839.

Carbides of the Alkalies and Alkaline Earths—Formation.—In continuation of his researches on metallic carbides, H. Moissan has established the fact that potassium, sodium, and magnesium carbides *cannot* be produced at the temperature of the electric furnace. By the action of cold acetylene gas, or liquid acetylene, with or without pressure, it is however possible to obtain the intermediate potassium and sodium acetylenes—C_2KH and C_2NaH—in a state of purity, and by elevating the temperature these bodies can be decomposed, potassium and sodium carbides—C_2K_2 and C_2Na_2—being left as residues. At a still higher temperature these carbides are dissociated into the metals and carbon, as in the case of the carbides of the alkaline earths, though a much higher temperature is required. The same holds good with magnesium carbide.—Pharm. Journ., Mar. 5, 1898, 227; from Compt. rend. cxxvii, 302.

Sodium Carbide—Properties.—Camille Matigon states that sodium carbide is obtained in the form of a white powder; its density at 15° is 1.575, and it appears to be quite insoluble. Dry air and oxygen have no effect on it at ordinary temperatures, but on gently heating combustion takes place, leaving a residue of CO_3Na_2. In the presence of chlorine gas it becomes incandescent, and with bromine the reaction is of almost explosive violence. Iodine has a more moderate action, and C_2I_4, melting at 185°, can be obtained. Hydrogen has no action at all. When thrown into water, carbide of sodium explodes violently, giving a deposit of carbon. It also becomes incandescent when in contact with CO_2 and SO_2. It acts in the cold on a large number of organic substances. The primary and secondary alcohols give off acetylene, giving rise at the same time to the corresponding alcoholate $2C_3H_7OH + C_2Na_2 = C_2H_2 + 2C_3H_7ONa$. — Chem. News, Jan. 21, 1898, 35; from Compt. rend. (No. 25), Dec. 13, 1897.

Calcium Carbide—Commercial Impurities.—According to H. C. Chatelier, the two elements most abundantly present as impurities in commercial calcium carbide are silicon and iron in the form of silicide, some small crystals of which have been found to have the formula $SiFe_2$, whilst the excess of silicon appears to unite either with the carbon or calcium, according to the relative proportions of those two bodies. If there be an excess of carbon over calcium, carbon silicide crystallizes in hexagonal plates which are generally of a blue color. On the other hand, excess of calcium results in the formation of calcium silicide, which is found in metallic grains possessing the color and lustre of zinc. There are apparently two distinct silicides of calcium, one of which is scarcely affected by nitric acid, whilst the other is easily attacked.—Pharm. Jour., Jan. 15, 1898, 45; from Bull. Soc. Chim. [3], xvii., 763.

Calcium Carbide—Experimental Preparation.—Zinno states that calcium carbide may be obtained from the crude calcium tartrate—formed in wine casks—by heating it in a cast-iron retort to 500° C. A hard, gray, spongy mass is thus obtained, which when brought in contact with water will produce lively effervescence with elimination of acetylene.—Pharm. Centralh., Sept. 30, 1897, 646; from Bull. chim. farm.

Liquid Carbonic Acid—Preparation from the Natural Springs at Saratoga.—John C. Minor mentions that the liquid carbonic acid in this country is manufactured from the gases collected from the natural springs of Saratoga, from the carbonic acid generated in the fermenting vats of breweries, and from that evolved by the decomposition of magnesite imported from Greece. Concerning its preparation from the waters of the mineral springs at Saratoga, he observes that at the recently erected works of the New York Carbonic Gas Company, the method employed in Germany is followed, the gas being before liquefaction first passed through a purifier, where every trace of the sulphur present in the gas is removed, and then through a drier to remove the moisture taken up by the gas from the water. The gas is collected in the gas holder and thence reaches the compressor to be liquefied. The modern type of high pressure air compressor has been found to be admirably adapted for use in liquefying the gas. In liquefying, however, while the pressure available is a great factor, it must be remembered that carbonic acid when heated as high as 88° F. reaches its "critical temperature"—that is, the temperature beyond which no pressure, however great, can liquefy the gas. Now as a temperature of about 190° F. is reached in the compression chambers because of the rapid compression, it is evident that a vast volume of very cold water is required to flow rapidly through the water-jackets of these chambers to absorb enough of this heat to reduce the gas below its critical temperature and enable it to be liquefied. At Saratoga a supply of water at from 48° to 50° F. is available, as well in the hottest part of summer as in winter, and since with cooling water at this temperature the gas can be liquefied at about 900 to 1000 pounds pressure, it is found that the liquefaction is always complete, and a temperature high enough to decompose the lubricant never reached provided, however, proper care be taken. The liquefaction is always performed in stages, for if the gas were directly submitted to 1000 pound pressure the heat thereby developed would be tremendous and the machinery would give way. In the first stage of compression the gas reaches a pressure of sixty pounds; its temperature is then reduced by passing it through a number of little pipes surrounded by cold running water known as the "inter-cooler." Being now cold it enters the next chamber, where it is raised first to 250 pounds pressure, and then again cooled down to the ordinary temperature. Lastly it reaches, in the third chamber, the final pressure of about 900 pounds, and the pipe which carries it away from here is about 300 feet long and coiled up in a tank through which cold water continually flows. From here the gas is delivered in a liquid form to the cylinders.—Bulletin of Pharmacy, July 1897, 316.

Carbon Dioxide—Industrial Utilization of the Product of Fermentation.—Dr. A. Fischer describes in brief detail the methods pursued in a large brewery for collecting, purifying, and condensing to liquid form the carbon dioxide resulting during the fermentation of the wort in the process of making beer. The amount of carbon dioxide which goes to waste under the methods heretofore in use in breweries is something enormous. This single brewery, with the apparatus probably not yet perfected, has during the past liquefied and sold more than 1,500,000 pounds of carbon dioxide, and the author estimates that the larger breweries of this country could easily furnish 100,000,000 pounds annually, which is perhaps three or four times the quantity at present needed. Contrary to what might be supposed, the gas generated in the fermenting tubs has an agreeable ethereal smell, due to traces of ethyl esters and other harmless substances; but this odoriferous gas can easily be removed by washing, just as carbonic dioxide generated from marble, magnesite, dolomite, etc., is at present purified. The most difficult problem has been to collect the gas in a condition free from air. The system of apparatus employed for this purpose is shown in a full-page cut, and the description of the process is thereby rendered clear and intelligible.—Pharm. Review, June, 1898, 214–220.

Carbon Dioxide—Description of Crystals.—A Liversidge states that when solid carbon dioxide is examined under the microscope it presents along its edge projecting wire-like crystals, which have branching filaments issuing from them, apparently at right angles, resembling somewhat the groups of minute crystals seen in crystallized iron, gold, and ammonium chloride. The rapidity with which the carbon-dioxide evaporates makes it difficult to catch the form of the crystals, either by photography or other means.—Chem. News, May 13, 1898, 216; from Proc. Australasian Assoc. for the Advancement of Science.

Alkali Carbonates and Bi-Carbonates.—Differentiation in Mixture.—A. Leys observes that the usual test for carbonates in presence of bicarbonates consists in adding the salt to be tested to a solution of magnesium sulphate, which, if bicarbonates only are present, remains clear, while carbonates will at once produce a precipitate of basic magnesium carbonate. The author finds, however, that the precipitate so produced is soluble in solutions of alkali carbonates and of borax. He has, therefore, instituted a series of experiments which show that in a solution containing 32 parts of sodium bicarbonate to 68 parts of crystallized sodium carbonate, the carbonate reaction is entirely overcome by the solvent action of the bicarbonate, no precipitate being obtained no matter how much magnesium solution was used. Neither could a reaction be obtained in a solution containing 40 Gm. borax to 60 Gm. sodium carbonate. When calcium sulphate was substituted for magnesium sulphate the detection of carbonates in presence of bicarbonates was successful in every case ; even the traces in sodium bicarbonate and in commercial borax could be detected. To apply the test the solution is added to a saturated solution of calcium sulphate ; if only bicarbonates are present a delicate, crystalline precipitate of calcium sulphate will appear, while if a trace of normal carbonate is present a white turbidity, due to amorphous calcium carbonate, appears at once. To detect the normal carbonate in sodium bicarbonate it is recommended to treat it with a quantity of water insufficient for complete solution, and to test the liquid decanted with calcium sulphate.—Pharm. Review, June, 1898, 238 ; from Ann. Chim. anal. appl. 3, 44.

Percarbonates—A New Class of Oxidizing Substances.—Constans and von Hansen have discovered a new class of oxidizing substances in the percarbonates. They obtain potassium percarbonate by electrolyzing a saturated solution of potassium carbonate and gradually lowering the temperature. The disengagement of gas at the anode gradually diminishes and finally ceases at about —10° C.,

Potassium Percarbonate, $K_2C_2O_6$, being formed at the same time as a bluish amorphous powder. This should be quickly thrown on a filter and dried over phosphoric anhydride, because it is very hygroscopic and decomposes water at the ordinary temperature, the bicarbonate being formed. When gently heated, oxygen and carbon dioxide are given off, the normal carbonate being left, and in the presence of oxidizable matter it acts as an oxidizing agent. It can, however, also act as a reducing agent, manganese dioxide being converted by its action into carbonate. Like the higher alkaline oxides and the alkaline earths, it produces hydrogen peroxide in the presence of acid. The authors conclude, therefore, that the new body is the neutral carbonate of potassium peroxide.—Chem. News, Oct. 1, 1897, 170 ; from Ztschr. f. Electrochemie.

Potassium Percarbonate—Properties.—A. von Hansen, referring to his observations made in conjunction with E. J. Constans (see above), communicates the results of further experiments with the object of determining the conditions most favorable to the production of potassium percarbonate, and to study some of its particular properties more closely. After describing the conditions of its preparation, he describes it as being an amorphous powder, having a blue tint in the wet state, which almost completely disappears on drying. Percarbonate of potassium decomposes easily, giving up its oxygen to oxidizable bodies. Its instability, however, is not so great as would have been at first thought ; to decompose it rapidly it is necessary to submit it to a temperature of 200° to 300°. Immersed in water it only decomposes slowly. If, for example, we place 0.3 Gm. of percarbonate of potassium into 50 Cc. of water, and then titrate with potassium permanganate, after adding dilute sulphuric acid, after the lapse of half an hour, we find that the loss is hardly 1 per cent. But at a higher temperature the splitting up into oxygen and bicarbonate of potassium takes place very rapidly. Thus percarbonate of potassium constitutes a primary body most convenient for the preparation of oxygen in laboratories. After having put the salt in water, it is only necessary to raise the temperature to 45° to obtain a very regular flow of gas. The decomposition is complete without having to raise the temperature any higher than 45°, and we finally obtain a solution not containing any percarbonate at all. From 100 Gm. of the salt we can obtain about 5 litres of oxygen. The traces of carbonic acid which might be given off at the same time are absorbed by an alkaline solution. The percarbonate is but very slightly soluble in alcohol, and it has up to the present time been quite impossible to obtain it in crystals from its aqueous solution. If we saturate water at 0° with percarbonate of potassium, and then lower the temperature to —15°, we obtain a voluminous crop of crystals, but they are formed almost entirely of ice. By appropriate methods of purification a salt may be obtained containing 95.68 per cent. potassium percarbonate, 3.84 per cent. potassium bicarbonate, 0.35 per cent. potassium carbonate, and 0.10 per cent. moisture.—Chem. News, Feb. 11, 1898, 65–67; from Zeitschr. f. Electrochem., 1897, 455.

CYANOGEN.

Pure Hydrocyanic Acid—Preparation.—Wade and Panting give the following convenient method for preparing pure hydrocyanic acid: A cold mixture of equal parts of sulphuric acid and water is allowed to drop on potassium cyanide. The hydrocyanic acid is given off regularly and in almost theoretical proportions, and is exceptionally pure. If concentrated sulphuric acid is used, pure carbon monoxide is obtained in almost theoretical quantity.—Merck's Rep., June 1, 1898, 339; from Jour. Chem. Soc.

Hydrocyanic Acid—Variable Effect on Plants and Animals.—Albert F. Woods reports on the results of experiments evidently made with the intention of learning about the value of hydrocyanic acid as an insecticide. Plants of various families and in different stages of growth were subjected to varying amounts of hydrocyanic acid gas, and were found to be affected by it in different degrees, according to the kind of plant, its age, and other conditions of growth and development. Animals, mainly insects, were also found to vary, even within the same family, in like manner. Mites were the most resistant of any of the organisms studied, often recovering after several hours of complete paralysis and apparent death.—Pharm. Review, March, 1898, 114; from Bot. Gazette, *25*, 113.

Hydrocyanic Acid—Production in the Seeds of the Pomeæ.—According to Lutz, amygdalin and emulsin are present in the seeds of plants belonging to the genera *cydonia*, *malus*, and *sorbus*, but not in those of *pyrus*, *mespilus*, and *cratægus*. In the pomeæ emulsin was found in the parenchymatous cells of the cotyledons, especially in the neighborhood of the vascular bundles, but not in the palisade cells; none was found in the hypocotyl, plumule, or radicle. Amygdalin occurs in the cells of the cotyledons which contain emulsin, trituration giving rise to the odor of bitter almonds; it is also present in the hypocotyl, plumule, and radicle.—Phar. Jour., Oct. 30, 1897; from Bull. Soc. Bot. de France, 1897, 26.

Chlorocyanamide—Preparation.—According to Paul Lemoult, when cyanuric chloride is digested in the cold with an ammoniacal solution the latter disappears completely—a salt of ammonia is formed and a white powder deposited, very slightly soluble in water: this is monochlorised cyanuramide, the chlorocyanamide—$C_3N_3(NH_2)_2Cl$—of Liebig. This impure product is dissolved in a large quantity of boiling water; on cooling, the filtered solution deposits fine needle-like crystals of the pure substance. Its molecular heat of combustion, at a constant volume, is 401.3 cals., and at a constant pressure 400.3 cals. The molecular heat of formation at constant pressure is therefore 25.6 cals.—Chem. News, Jan. 7, 1898, 10; from Compt. rend. Nov. 22, 1897.

Silver Cyanamide—Formation and Purification.—Paul Lemoult observes that silver cyanamide, CN_2Ag_2, is one of the most characteristic derivatives of cyanamide. It is formed by the reaction of an ammoniacal solution of NO_3Ag on an aqueous solution of cyanamide, from which it is obtained as a yellow precipitate, but is not easily obtained pure. To effect its purification, it must be suspended in water and acted on by an excess of HNO_3 in the cold. After filtration—the solution being never complete—the liquid is precipitated little by little with ammonia, and after repeating this treatment several times the pure product may finally be obtained.—Chem. News, Jan. 7, 1897, 12; from Compt. rend. 1898, No. 20.

ALKALIES.

Potassium — Expeditious Method of Determination. — The following method of H. N. Warren for the determination of potassium is convenient, accurate and expeditious. The solution containing alkaline chlorides, from which the accompanying group metals have been removed, is heated with excess of platinum chloride, and the whole evaporated to a very small bulk in a platinum dish. A mixture of equal parts of amylic alcohol and ether, amounting to about double the quantity of the original solution, is then added to the contents of the dish, when a dense yellow precipitate is obtained, which is easily washed once or twice. The washed precipitate is next transferred to a beaker and heated to boiling with formic acid. When the liquid assumes a brownish tint, a slight excess of ammonia is added, and the mixture again boiled, when the whole of the platinum is precipitated in the form of black flakes, which may be readily washed, dried, weighed, and the percentage of potassium calculated from the ascertained weight.—Chem. News, lxxv (1897), 256.

Sodium—Volumetric Method of Estimation.—H. J. H. Fenton recommends a method of estimating sodium which is based upon the sparing solubility of the sodium compound of *dihydroxytartaric acid*, and upon the readiness with which the latter is oxidized by potassium permanganate in the presence of dilute sulphuric acid—the latter reaction affording a convenient method for the estimation of the acid or of its salts. The substance to be examined, in concentrated neutral solution, is mixed with excess of potassium dihydroxytartrate, and the mixture is kept at 0° for half an hour. The precipitated sodium salt is washed with a little ice-cold water, dissolved in excess of dilute sulphuric acid and titrated with potassium permanganate.

The results obtained with sodium sulphate, chloride, nitrate, acetate, and with rochelle salts, are accurate within 0.3 per cent. The presence of magnesium does not interfere with the accuracy of the results; but ammonium salts, if present in excess, lead to low results. Full details for working the process are given in the paper, which was read at an ordinary meeting of the Chemical Society, Feb. 3, 1898.—Chem. News, Feb. 18, 1898, 78.

Caustic Soda—Estimation in Presence of Carbonate—T. Dobringer and W. Schranz recommend the following volumetric method as giving sufficiently accurate results in estimating the caustic alkali and the carbonate of soda in caustic soda: To 2.65 Gm. of caustic soda dissolved in 50 Cc. of water, add phenolphthalein, and titrate with normal sulphuric acid until the red color disappears. Then add 3 Cc. more of the normal acid, and boil for five minutes to drive off the carbonic acid; then titrate the excess of acid by normal soda. If a be the number of Cc. of normal acid used in the first titration, and b the number of Cc. of normal soda used in the second titration (after driving off the carbonic acid), then the proportion of caustic soda present will be $2\ (2\ a—b)$ per cent., corresponding to NaHO and $4\ (b—a)$ per cent. Na_2CO_3. The method, as is well known, is based on the fact that, in the first titration, the whole of the caustic alkali is neutralized, and half the carbonate transformed into bi-carbonate—

$$NaHO + Na_2CO_3 + H_2SO_4 = Na_2SO_4 + NaHCO_3.$$

This reaction has served as the starting-point for a large number of methods for the estimation of caustic alkalis in presence of the carbonate; but these methods only give exact results when the quantity of carbonate present is very small. — Chem. News, May 20, 1898, 229; from Zeitschr. f. Angew. Chem., xiv., 455.

Sodium Peroxide — Use as a Reagent in the Analysis of Coke, Coal and Asphalt.—The statement of J. Clark that the action of sodium peroxide on coke and coal is too violent to permit its use in analysis, is contradicted by the experience of C. Glaser, who has used it in coke, coal and asphalt analyses for sulphur with perfect success. He observes that it is necessary that the material to be analyzed be placed in a sufficiently large silver or nickel dish, and covered with about four times its weight of sodium carbonate. The dry peroxide is then dusted upon the mass in small quantities at a time until all the carbon is consumed ; then heat the mass, if necessary, to perfect fusion, and determine the sulphur in the fused mass in the usual way.—Journ. Amer. Chem. Soc., 1898, 130.

Ammonia—Reagents for its Detection in a Gaseous Atmosphere.—G. Deniges observes that while the detection of ammonia gas in a gaseous atmosphere has been made extremely easy by the use of Nessler's solution, introduced into this atmosphere with a glass rod, the presence of amines of the fatty series deprives it of its special value. He therefore reviews the principal reagents for ammonia and amines, and enumerates them according to the degree of their specific action in the following order :

1. *Hypobromite of Sodium.*—This body gives off bubbles of nitrogen gas under the influence of ammonia. It gives insoluble yellow compounds with the primary fatty amines. It does not react sensibly on the secondary and tertiary amines.

2. *Nessler's Solution* gives a kermes-red precipitate with ammonia, a yellow precipitate with monomethylamine, and a white precipitate with monethylamine. This latter precipitate rapidly becomes yellow if the reagent is in excess, and regains its white color with an excess of amine. With dimethylamine and diethylamine it gives a white precipitate ; with the latter body the precipitate is soluble in an excess of amine. Finally, with trimethylamine, and above all in an excess of amine, it gives a white precipitate, rapidly becoming brown.

3. *Mercurous Nitrate, Hæmatoxylin, Formol.*—The first of these in solution becomes black on contact with ammonia or fatty amines. Hæmatoxylin takes a carmine color, and formol gives hexamethylene tetramine, which forms a yellow precipitate with bromine water acidulated with acetic acid.—Chem. News, June 10, 1898, 267 ; from Bull. Soc. de Pharm., March, 1898.

Ammonium Hyperoxide—Formation and Characters.—According to Melikoff and Pissarjewsky, if a concentrated ethereal solution of gaseous ammonia, cooled to 20° C., is allowed to act upon a concentrated ethereal solution of hydrogen dioxide, cooled to the same temperature, the odor of ammonia disappears, and a heavy fluid is separated. This is "ammonium hyperoxide," a body having a strongly alkaline reaction, and easily soluble in alcohol, but insoluble in ether. In aqueous solutions it decomposes, oxygen being liberated and a small quantity of ammonium nitrite formed. Dilute sulphuric acid liberates hydrogen dioxide from it. Ammonium hyperoxide may be obtained in the form of a solid mass of acicular crystalline leaflets, if the liquid obtained as above is subjected to further cooling. Its composition is given as corresponding to the formula, $(NH_4)_2O_2 + 2H_2O_2 + 10H_2O$, but the amount of water of crystallization is not constant.—Apoth. Ztg., March 19, 1898, 194; from Berichte, 1897, *30*, 3144.

Ammonium Carbonate—Commercial Quality.—Prof. W. A. Puckner reports upon the examination by his students of two samples of ammonium carbonate. A sample occurring in opaque masses, with the inner portion only translucent, and with the exception of faint reactions for calcium sulphate, and metals precipitated by hydrogen sulphide, gave negative results by the pharmacopœial tests. In the determination of the percentage of NH_3 present in the sample, he found considerable difficulty in the titration owing to the use of the indicator, rosolic acid, directed by the Pharmacopœia, the delicacy of the latter being sensibly affected by the presence of carbon dioxide. The difficulty was finally overcome by the use of litmus, adding an excess of volumetric acid, boiling to expel the liberated carbon dioxide, and titrating back with standard alkali. The sample contained 30.59 per cent. NH_3, instead of 32.54 per cent. required by a sample of official quality. A second sample, consisting of opaque friable lumps, responded favorably to all tests of purity, but, as expected, had completely changed by exposure to acid ammonium carbonate, which contains 21.57 per cent. NH_3 theoretically, whereas the sample under examination contained 21.53 per cent.—Proc. Ill. Pharm. Assoc., 1897, 69–70.

ALKALINE EARTHS.

Alkaline Earths—Quantitative Separation.—The following method for the separation of barium, strontium, and calcium is recommended by Rawson. The carbonates of these bases are heated with nitric acid, and evaporated, either in a beaker or in a porcelain dish, upon the water-bath until the mass is quite dry. Concentrated nitric acid is added in excess and the mixture well stirred, when the nitrates of barium and strontium remain insoluble; this residue may be washed either with the concentrated acid by decantation, or in the customary way upon the paper. The filtrate is evaporated either to dryness, taken up with hydrochloric acid, and the calcium precipitated as oxalate, or evaporated down with sulphuric acid, and the residue, after ignition, weighed as sulphate of calcium. The remaining insoluble nitrates are dissolved in water, the solution made alkaline with ammonium hydrate, acidified with acetic acid, and the barium precipitated as chromate. The filtrate is warmed with hydrochloric acid and alcohol until the excess of chromate is reduced, the chromium precipitated as hydrate and filtered off. The filtrate is evaporated to dryness upon the water-bath with a little sulphuric acid. The residue is treated with dilute alcohol and washed, and the residual strontium sulphate weighed as such.—Jour. Soc. Chem. Ind., xvi., 114.

Magnesia—Commercial Quality.—Prof. W. A. Puckner reports the results of the examination of two samples of magnesia by his students. One of the samples contained iron, calcium and carbon dioxide in excess, did not form a gelatinous mass within half an hour when mixed with 15 parts of water and on ignition lost 38 per cent. of its weight, while the second sample was not much better, though losing only 15.8 per cent. upon ignition. The U. S. P. permits a loss of 5 per cent. on ignition.—Proc. Ill. Phar. Assoc., 1897, 71.

Magnesium Oxybromide—Preparation.—Oxychlorides of magnesium have long engaged the attention of chemists, though neither the oxybromide nor oxyiodide have hitherto been prepared. Tassily has now succeeded in obtaining oxybromide, though all his efforts to prepare an oxyiodide have been in vain. Three hundred Gm. of water, containing 145 Gm. of crystallized bromide of magnesium, were heated to boiling; the flame was withdrawn, and 5 Gm. of calcined magnesia was added in small portions. It is again boiled, and the magnesia dissolves; towards the end of the operation the temperature is raised to 150°. The solution is filtered hot, and placed in a well-stoppered bottle. After a fortnight the oxybromide is deposited in small crystalline needles, acting on polarized light, showing longitudinal extinctions. The composition of this body answers to the formula $MgBr_2,3MgO,12H_2O$. When heated to 120° in dry air it loses half its water. These oxybromides undergo a change when exposed to the air, with the fixation of carbonic acid; they are decomposed by water, alcohol, and most reagents.—Chem. News, Feb. 18, 1898, 83; from Bull. Soc. Chim., 1897, No. 23.

Strontium Sulphide—Preparation of a Highly Phosphorescent Compound—J. R. Mourelo prepares a most satisfactory phosphorescent strontium sulphide, as follows: An intimate mixture of 285 Gm. commercial strontium carbonate, 62 Gm. flowers of sulphur, 4 Gm. cryst. sodium carbonate, 2.5 Gm. sodium chloride, and 0.4 Gm. bismuth subnitrate are placed in a crucible, covered with a layer of coarsely-powdered starch, and then submitted for five hours to a bright red heat, after which it is allowed to cool slowly during ten or twelve hours. The white friable mass thus obtained develops a fine greenish-blue phosphorescence when exposed for about one second to daylight. It becomes inert when powdered, but may usually be restored by re-ignition with starch.—Am. Jour. Pharm., Nov., 1897, 607; from Compt. rend., *124*, 1024.

Strontium Sulphide—Influence of Temperature on its Production by SH_2.—In continuation of his experiments above, Mr. Mourelo has found that temperature has a curious influence on the results in carrying out the process of producing strontium sulphide from strontia or its carbonate by means of hydrogen sulphide. A porcelain tube containing either strontia or strontium carbonate is placed in a furnace, and the hydrogen sulphide gas is passed over it, at first in the cold. The tube is then gradually warmed to a bright red heat, taking care that the current of gas is strong enough to carry off the water formed by the reaction. When the transformation is complete a slow current of dry hydrogen is substituted for the hydrogen sulphide; after which the tube is allowed to cool, and the contents, strontium monosulphide, may be withdrawn; this sulphide is not phosphorescent. At a red heat the formula of the reaction is $SH_2+SrO=SrS+H_2O$. If the temperature is not sufficiently high, the water condenses in the tube and attacks the sulphide already formed, and a mass has been found containing 22 per cent. of strontium hydroxide and smelling strongly of hydrogen sulphide.—Chem. News, Dec. 31, 1897, 326; from Compt. rend., Nov. 15, 1897.

EARTHS.

Aluminum—Soldering by the Aid of Cadmium Iodide.—According to A. T. Stanton, cadmium iodide gives more satisfactory results as a soldering agent than the alloys and fluxes usually employed, its action being dependent upon the formation of an alloy of cadmium and aluminum under violent evolution of iodine vapor. A further improvement is effected by mixing concentrated zinc chloride solution with a little ammonium chloride, evaporating in a porcelain dish, igniting at a low red heat till part of the ammonium chloride is volatilized, then mixing the pure chloride with an amount of cadmium which must be determined by experiment. The result is a flux which enables tin, etc., to unite properly with aluminum. The melted flux should be dropped on the surface of the metal to be soldered, and some powdered metallic tin sprinkled on the surface; the heat of a Bunsen flame is then applied to the metal till the flux just melts, after which it may be spread where wanted with a piece of copper wire. As the temperature is further raised the flux decomposes and the tin readily alloys itself with the aluminum.—Pharm. Jour., Aug. 28, 1897; 192; from Nature, lvi., 353.

Aluminum—Successful Copper-Plating.—It is announced that a German engineer, Wachnitz, has succeeded in plating aluminum with copper, by a welding process, in any desired thickness, and that even in the thinest sheets there is no separation when rolled or drawn. It is, furthermore, stated that the plated sheets can be easily soldered, grooved, tinned and nickled. This is very important, since among the obstacles to the still wider use of aluminum has been its poor ability to solder, weak power of resistence to numerous fluids, and the fact that paint does not adhere to it well.—Merck's Rep., April 15, 1898, 247; from Scient. American Suppl.

Aluminum—Use of Borax as a Polish.—According to "Bull. Gén. de Thérap," a solution of borax, 30, in water, 1000, to which a few drops of solution of ammonia are added, furnishes a good polish for aluminum.—Pharm. Journ., Dec. 18, 1897, 543.

Alum—Commercial Quality.—Prof. W. A. Puckner reports upon the examination by his students of alum of the market—both whole and powdered. All the samples responded favorably to the pharmacopœial tests, and ammonia alum appears to have disappeared from the market.—Proc. Illinois Pharm. Assoc. 1897, 69.

"Lucium"—Probably Impure Yttrium.—Waldron Shapleigh has prepared the nitrate from a specimen of the so-called "lucium," prepared by Dr. Leon Schützenberger, of Paris, and subjected the product of incineration to analysis, with the following results: Yttrium group oxides, 93.98 per cent.; lanthanum, cerium, didymium oxides, 3.74 per cent.; thorium oxide, 1.07 per cent.; titanium, zinconium, potassium, sodium oxides and sulphuric acid, not separated, 1.21 per cent.—Chem. News, July 23, 1897, 41; from Jour. Franklin Inst., July, 1897.

Tellurium—Industrial Production.—J. Farbaky describes the process for preparing tellurium at Schemnitz tellurium works, in Hungary. The first stage is to attack the ore by strong sulphuric acid, to which end 350 kilos of concentrated acid are raised to boiling-point in a cast-iron pot, into which 150 kilos of Transylvania ore are ladled with continuous stirring. This results in the decomposition of the metallic carbonates, and the solution of lead, copper and zinc along with the tellurium and a part of the silver, leaving gold and silica in the residue. The action of the acid is assisted by gradual and progressive heat until the mass is of a syrupy consistency, a stage attained usually in about six hours. The mass is next lixiviated with 250 to 300 litres of boiling water, containing 10 to 15 per cent. of hydrochloric acid, to extract the soluble compounds formed, the acid acting as a precipitant of the dissolved silver and re-dissolving the tellurium hydroxide thrown down during the dilution of the mass. This operation, with continued stirring, lasts for six hours, and on the following day the liquid and solid materials are separated by filtration under pressure, the gold and silver in the residual cake being recovered in the ordinary manner. The filtrate is run into lead-lined wooden precipitating tanks, about 1 M. long by 0.50 M. wide, into which a current of gaseous sulphur dioxide (purchased in a liquid form in strong cylinders) is passed. At the end of twelve hours the green solution turns brown and black, flakes of tellurium begin to separate out; and when a sample of the liquor ceases to give a precipitate with a little hydrochloric acid and sodium sulphite, the operation is at an end. The mother-liquor is absorbed by slaked lime and ashes, and roasted, etc., for recovering the other metals present. The product is usually between 72 and 85 per cent. pure, the chief impurity being copper, of which about 6 per cent. is present, along with about 8 per cent. of tellurium oxide. The process, however, is superior to the zinc process, which yields a product only 29 per cent. pure.—Chem. News, July 30, 1897, 56; from Ztschr. Angew. Chem.

MANGANESE.

Manganese—Universal Presence in Ligneous Tissues.—Guérin states that manganese is universally present as an organic compound in the ligneous tissues of trees. If sawdust is treated with feebly alkaline water and the extract is acidulated with hydrochloric acid, a precipitate will be obtained which, when washed with acid water and burnt, is found to contain no iron, but 0.4 per cent. of manganese and 4.6 per cent. of nitrogen.—Pharm. Journ., Oct. 2, 1897, 298; from Comptes rendus, cxxv, 311.

Manganese—Quantitative Estimation by Electrolysis.—Friedrich Kappel states that the electrolytic estimation of manganese by using a neutral or slightly acid solution, requires a very strong current, and the results are not entirely satisfactory. He finds, however, that, by the addition of acetone to the solution, much better results are obtained; the precipitate of MnO_2 being obtained as a fine powder. A table of experimental results is given, which agree very well with the calculated ones. The author also attempts the quantitative separation of iron and manganese electrolytically by adding H_3PO_4 to the solution of the sulphates, which succeeds fairly well.—Chem. News, April 29, 1898, 201; from Zeitschr. f. Angew. Chem., 1898, No. 4.

Manganese—Colorimetric Method of Estimation.—Manganese is found in small quantities in a large number of plants, and many botanists consider it necessary to their proper nourishment. Lemaire observes that the ordinary gravimetric and volumetric methods of analysis are not suitable for estimating these small quantities; but, on the other hand, the colorimetric method is very convenient. It depends on the reaction pointed out by Hoppe-Seyler: If, to a substance free from chlorine, and containing manganese, we add binoxide of lead and nitric acid, we obtain, on heating to boiling, a violet coloration due to the formation of permanganic acid. This reaction is very sensitive, and will detect 1–2,000,000th part of manganese. The leaves of a sample of wild chicory, dried at 100°, gave 19.20 per cent. of ash and 0.0004 per cent. of manganese. The roots of another sample contained 0.0002 per cent. of this element.—Chem. News, Oct. 29, 1897, 219; from Bull. Soc. de Pharm. de Bordeaux, Sept. 1897.

The same method is recommended by P. Pichard, who applies it to the

Estimation of Manganese in Soils, as follows: The soil is dried and finely pulverized, then incinerated at a dull red-heat in a small platinum crucible, after which it is calcined with dried and powdered sodium carbonate or potassium. Of this incinerated soil, 0.5 to 1. Gm. is taken, according as the coloration is more or less pronounced after the incineration; the residue is then thoroughly mixed with two parts of the alkaline carbonate. The vitreous or opaque mass produced is detached by adding a little water acidulated with nitric acid; this is placed in a test-tube, and about 0.5 Gm. of minium or of binoxide of lead is added. Four Cc. of of water and 2 Cc. of pure nitric acid are then poured in. Heat to boiling until the volume of the liquid is reduced by one-half; let stand until the insoluble matter has settled; the supernatant liquid should be rose-colored if the earth contains traces of manganese. In the case of organic matter, the dried substance is incinerated, calcined with an alkaline carbonate, and then treated as in the case of the soil. A few decigrams will be enough for the test.—Chem. News., March 11, 1898, 108; from Compt. rend, 1898 (cxxvi), No. 7.

Manganese Salts—Use as Oxidizing Agents, etc.—Villiers finds that when an oxidizable body is placed in a medium capable of supplying oxygen, but under such conditions that oxidation takes place slowly or not at all, that on adding a trace of a manganese salt, action rapidly sets in. Sucrose, glucose, and carbohydrates generally are rapidly oxidized under certain conditions in the presence of traces of manganese, a fact that may indicate a useful application of its salts in medicine. Taking advantage of this fact also, the author applies manganese salts for the purpose of oxidizing organic matters in the course of toxicological analysis, finding it quite as effective as potassium chlorate, while the process is more easily conducted. The organic matter is introduced into a flask fitted with a stoppered funnel, and with a gas delivery tube. Pure hydrochloric acid diluted with two or three volumes of water is added, followed by a solution of a manganese salt and a little nitric acid, a further small quantity of the latter being added as the reaction slackens, due to its being used up in the process of oxidation. The mixture is gently warmed according to the activity of the disengagement of gas, to regulate which a few fragments of gas carbon are introduced into the flask. Such organs as liver, spleen, and lungs are disintegrated in a few minutes, and muscular fibre is dissolved completely in the course of an hour.—Pharm. Journ., July 31, 1897, 81; from Compt. rend., cxxiv, 1458.

Mangani-Molybdates—Formation and Character.—Téchard states that when a solution of acid ammonium molybdate is boiled with hydrated manganese peroxide, a ruby-red liquid is formed, which is

Mangani-Molybdate of Ammonium.—To prepare the salts in definite crystalline form, the author first transforms the acid ammonium molybdate into a double molybdate of ammonium and manganese, by mixing hot solutions of molybdate and of a manganous salt. The yellow precipitate of the double salt thus obtained is suspended in water and permanganate of potassium gradually added to it, when the violet colour of the permanganate is changed to the ruby-red of the mangani-molybdate. Ammonium mangani-molybdate—$3(NH_4)_2O.MnO_2.12MoO_3.5H_2O$, forms fine red stable crystals, slightly soluble in water; the potassium salt forms small crystals not so deep in color as the preceding salt, and almost insoluble in water.

Mangani-Molybdate of Sodium forms large blood red crystals and has the composition $3Na_2O.MnO_2.12MoO3_3.13H_2O$.

Mangani-Molybdic Acid is obtained in the free state by treating the barium salt with an equivalent of normal sulphuric acid; by evaporating the red liquid so obtained *in vacuo* a blackish mass with a vitreous fracture showing no signs of crystallization is obtained. The formula for this is $MnO_2.12MoO_3.10H_2O$.—Pharm. Journ., Aug. 28, 1897, 189; from Comptes rendus, cxxv., 31.

Acerdol—Probably a Potassium Manganate.—It is stated in "Petit Mon. P." (xlviii) that the compound named acerdol by Foerster, who attributes the formula Mn_2K_2KOH to it, is obtained by oxidizing manganese and potash, dissolving the resulting compound in water, and crystallizing after concentration. Acerdol forms brilliant crystals which give a green solution with water.—Pharm. Journ., Feb. 26, 1898, 186.

IRON.

Iron—Method of Determining Carbon.—According to J. George Heid the following is a rapid and practical method for determing carbon in iron: The sample is treated with copper ammonium chloride in the usual manner, and the separated carbon is collected on an asbestos filter, where it is washed successively with water, alcohol, and ether; it is then transferred to a Rose crucible, dried at 120°, and weighed. A stream of oxygen is led into the crucible, which is heated over a Bunsen flame, and the carbon is thus burned off in from three to five minutes; the difference in the weight is the "total carbon." The "graphitic carbon" is obtained by dissolving the iron in dilute hydrochloric acid and determining the separated carbon as before.—Chem. News, Oct. 8, 1897, 183; from Eng. Min. Journ., lxiii., 64.

Reduced Iron—Estimation of Metal by the Use of Iodine.—Prof. E. Schmidt recommends the use of iodine instead of the mercuric chloride process for the estimation of metallic iron in reduced iron, as follows: Weigh accurately 0.4 Gm. of reduced iron in a state of fine powder, place in a 100 Cc. flask, add 5 to 10 Cc. of water and then gradually 2 to 2½ Gm. of iodine which has previously been thoroughly dried, if necessary over unslaked lime. Weigh the iodine in a small dry glass tube, empty it into the flask, and determine the amount used by the difference in the weight of the tube before and after it is used. The iodine forms a compound with the free iron, but not with any ferric oxide which may be present. Now rinse down the iodine left in the neck of the flask with some water, add 1 Gm. of potassium iodide, and when all the iodine has dissolved add sufficient water to make 100 Cc.; agitate thoroughly and allow to stand. Measure off 50 Cc. of the clear liquid and titrate the free iodine with decinormal sodium hyposulphite solution. Having thus determined the excess of iodine used, the quantity of the iodine which has combined with the iron can readily be determined and the amount of iron then ascertained by a calculation based on the reaction: $Fe + 2I = FeI_2$.—Amer. Drugg., Oct. 15, 1897, 245; from Proc. Soc. Germ. Nat. and Phys., Sept., 1897.

Iron—Prevention of Rust.—It has been observed that iron, zinc and aluminium remain bright in slightly alkaline water, while in aerated water or alcohol, or when exposed to moist air, these metals are oxidized rapidly. Maréchal, therefore, recommends that iron or steel instruments should be kept in solution containing 2 per cent. of sodium carbonate, bicarbonate, borax, or in an alcoholic solution of sodium benzoate. A very minute amount of alkali appears to be sufficient for preventing rusting, for even a saturated solution of borax in 95 per cent. alcohol, which could contain only a minute trace of borax, was found to be quite effectual in preserving the needles of Pravaz syringes.—Pharm. Jour., July 3, 1897, 3; from Jour. de Pharm., 1897.

Ferrous Sulphate—Disinfectant Value.—E. Ricke has experimented with the view to determine the value of ferrous sulphate for disinfecting human excrementa. He finds that its dilution of 2.5 : 1000 has the effect of destroying, within a few minutes, the pathogenic germs contained in the fæces of typhus and cholera patients. These and other observations convince him of the great utility of ferrous sulphate as a disinfectant, and he strongly recommends it for the disinfection of closets.—Pharm. Centralh., Aug. 19, 1897, 534.

NICKEL.

Nickel—Assay of its Alloy with Copper.—A. Riche recommends the following rapid and exact method of assaying alloys of copper and nickel, which are used for coins in two of the French colonies. The alloys used are not of the same composition: one containing 25 per cent. of nickel, and the other only 15 per cent. The alloys being binary, it is really only necessary to determine one of the metals—the copper, for instance. But as the nickel is the most expensive of the two metals, it is preferable to estimate it directly rather than to deduce its weight by difference. The operation is carried out as follows: About 1 Gm. is attacked with the smallest quantity possible of nitric acid on a sand-bath; when finished, add a little water containing five or six drops of sulphuric acid and evaporate to dryness. Take up with water still containing a little sulphuric acid, and again evaporate to dryness to make sure that all the nitric acid is driven off; re-dissolve in water with a little sulphuric acid, and pour into an electrolytic crucible, filling it about one-third full. The copper alone is deposited. The remaining solution is saturated with ammonia and electrolyzed with three Daniell cells. This brings down the nickel, and the whole process gives very concordant results. The difference between the total weights found and 100 represents the impurities—consisting of sesquioxide of iron, also oxides of manganese and aluminium—in the nickel. In the case of a bronze coin, 475 Mgm. of copper were deposited in four hours with a current of half an ampère.—Chem. News., Nov. 12, 1897, 241; from Journ. de Pharm. et Chim. (6), vi (1897), No. 7.

CHROMIUM.

Chromium—Estimation in Chrome-Iron Ore.—H. Fresenius and H. Bayerlein propose the following method for the estimation of chromium in chrome-iron ore: A weighed quantity of finely-powdered ore is digested in a 300 Cc. flask with 50 Cc. of concentrated HCl, at first in the cold, and as soon as the evolution of gas ceases it is gently warmed, until a very slight insoluble residue remains. The liquid and the residue are placed in a basin and evaporated to dryness. Silicates are then removed with HCl and water, and the liquid is filtered. The dark-colored residue is fused in a silver crucible with Na_2O_2, and then treated with water and the yellow solution filtered. There remains on the filter paper a black residue, insoluble in HNO_3. The solution is treated with HCl to precipitate any silver, and the filtrate concentrated by evaporation. The residue is now treated with a little HCl and water, and again excess of Na_2O_2 is added, by which some iron precipitate is obtained free from chromium. To free the solution from excess of acid, it is placed in a 500 Cc. flask, together with the solution obtained from the first fusion with Na_2O_2; excess of Na_2O_2 is added, and the solution shaken and warmed, until the evolved gas ceases to come off. It is filtered, and the iron precipitate obtained, after washing, is dissolved in HCl. The solution is again concentrated by evaporation, added to the residue, and once again treated with Na_2O_2. By this method the iron precipitate is always free from chromium. To separate the chromium from its strong alkaline solution it must be concentrated, and then carefully neutralised with HCl, and H_2O_2 added until the slight blue color of the solution is changed to green on warming. The solution is now boiled, the H_2O_2 decomposing, and the liquid evaporated to dryness. The residue is treated with HCl, and the chromium will come down with ammonia free from silicates. If the chromium oxide obtained is not a pure product, it can be fused with soda and saltpetre, treated with water, and the aqueous solution decomposed with ammonia and ammonium carbonate.—Chem. News, March 25, 1898, 141; from Ztsch. Anal. Chem. 1898, No. 1.

Sodic Chromous Carbonate—Preparation and Characters.—G. Bauge states that if to well-washed and still damp chromous acetate a solution of sodium carbonate in boiled water is added, the acetate immediately goes into solution, and, almost immediately, a reddish-brown body is precipitated. This precipitation must, however, be carried on in an atmosphere of carbonic acid perfectly free from oxygen. This sodic chromous carbonate forms two hydrates, one containing ten molecules of water and the other one molecule. The former is a reddish-brown powder, showing lozenge-shaped crystals under the microscope; it is an energetic reducing agent; it decomposes water below 100°, giving off hydrogen. In vacuo it loses water at the ordinary temperature; at 100° it forms the hydrate with one molecule of water. Dilute sulphuric and hydrochloric acids dissolve it, giving blue solutions. The salt with one molecule of water is a yellow powder, with very similar properties to the other one; heated in vacuo or in a current of hydrogen, it changes its color to a dark brown, becoming yellow again on cooling. Cold boiled water gradually changes it into the salt with ten molecules of water; when heated in a current of chlorine it gives chloride of chromyl. Analyses give these two compounds the following formulæ: $Na_2CO_3CrCO_310H_2O$ and $Na_2CO_3CrCO_3H_2O$.—Chem. News, April 15, 1898, 177; from Bull. Soc. Chim., 1898, No. 3.

ZINC.

Zinc—Occurrence in Drinking Water.—Percy A. E. Richards calls attention to a contamination with zinc of a supply of drinking water stored in a reservoir from which it was supplied to a private residence through a galvanized iron pipe about 2 miles in length. The analysis showed the following contents per gallon: Free ammonia, 0.0042 grain; albuminoid ammonia, 0.0028; nitrogen as nitrates, 0.035; chlorine as chlorides, 1.3; total solids, 14.35; zinc bicarbonate, 5.12 grains; and traces of iron. The presence of zinc was easily detected in the unconcentrated water by both the ammonium sulphide and the potassium ferrocyanide tests. Upon boiling the water a precipitation of zinc carbonate took place.—Chem. News, Dec. 17, 1897, 293.

COPPER.

Copper—Quality of Commercial, so-called "Pure for Analysis."—J. W. Westmoreland has examined copper foil, designated "pure for analysis," and found it to contain 99.30 per cent. of copper, together with 0.02 per cent. of lead, and some arsenic. Another sample contained 99.10 per cent. of copper, while a sample marked "Copper Foil Opt." contained 99.81 per cent. of copper, and another marked "Free from Arsenic" contained 99.23 per cent. of copper and 0.67 per cent. of arsenic. Seven other samples contained varying percentages of copper, from 99.03 to 99.87 per cent., while an eighth sample was absolutely pure, but the only one so found. The author used the electrolytic and the iodine methods for determining the percentage of copper in the various samples, and observes that it is evident that although samples which give 100 per cent. by the electrolytic test may possibly *not* be pure, samples which give lower results —say 99.5 per cent.—cannot possibly be pure.—Pharm. Journ., April 30, 1898, 409; from Analyst, xxiii, 86.

Copper—A Plant in Queensland which Indicates its Presence.—Sketchley, of the "Geological Survey of Queensland," calls attention to the curious fact that the presence of a caryophyllaceous plant,

Polycarpœa spirostylis, is a sure sign of the presence of copper lodes. It is called "copper plant," and occurs all over the copper region of Queensland, but always on or close to the deposits of that metal, or along water courses charged with copper in solution. The government analyst, Mr. Brownly Henderson, finds distinct traces of copper in the ash of the plant, more than can be accounted for by mere accidental absorption.—Pharm. Jour., Jan. 29, 1898, 89; from Gard. Chron., 1897 (xxii.), 417.

Copper—Use of Acetylene as a Quantitative Reagent.—See *Acetylene*, under "Organic Chemistry."

Cuprous Sulphate—Probable Existence in Solution.—Experiments made by A. Joannis seem to show that cuprous sulphate can be formed under certain conditions, that his attempts to isolate it were unsuccessful. If finely divided metallic copper, obtained by electrolytic deposition on a platinum plate, be digested with a solution of cupric sulphate, in the presence of carbon monoxide, slow absorption takes place, the copper dissolving and the solution becoming decolorized. The conditions of the experiment may be varied to some extent without difference in the result, and it is assumed that cuprous sulphate is probably formed and combines with the carbon monoxide to form a compound analogous to that obtained when that gas is absorbed by a solution of cuprous chloride. Decomposition of the solution resulted when the gas was removed by the mercury pump as soon as the pressure was reduced to about 2 or 3 Mm., a pellicle of metallic copper forming on the surface, whilst the solution became blue, the reaction being thus shown to be a reversible one.—Pharm. Journ., Jan. 22, 1898, 68; from Compt. rend. cxxv, 948.

Copper Arsenite—Value in the Gastro-Intestinal Catarrh of Children.—Dr. Kruger finds copper arsenite to give marvelous relief to young children in cases of acute infectious gastro-intestinal catarrh. A 1 in 100,000 solution of arsenite of copper was given in teaspoonful doses every ten or fifteen minutes, followed by a teaspoonful of iced milk every half hour, to a child of nine months old; the vomiting at once ceased and the diarrhœa was soon checked. It was prescribed later in powder form with sugar of milk $\frac{1}{500}$th of a grain every hour. In most cases $\frac{1}{60}$th of a grain in twenty-four hours was sufficient to relieve the dangerous symptoms, and it was never necessary to give more than three times this amount during the course of the disease.—Pharm. Journ., Nov. 6, 1897, 416; from Allgem. Medic. Central-Ztg.

LEAD.

Litharge—Commercial Quality.—Frederich A. Haussmann, in connection with his experiments upon "Liquor Plumbi Subacetatis" (which see under "Pharmacy"), had occasion to examine into the commercial quality of litharge, the more particularly since one of the queries presented to the American Pharmaceutical Association implies that "commercial litharge is grossly adulterated." The author examined twenty-five samples, obtained in each case from a different source, and says that "not one was found which could be considered as grossly adulterated." His results are given in the form of a table. Physically, the respective samples differed little, but evident carelessness in keeping the oxide, especially when procured from the paint-shop, was apparent. The color varied in few instances; of several samples, however, one contained red lead. The examination was made by the pharmacopœical directions, supplemented by the direct determination of the amount of absolute lead oxide, instead of determining it by the difference between the original quantity and the amount left undissolved by acetic acid. The direct determination is essentially the same as that proposed by the author for determining the absolute amount of lead acetate (which see under "Organic Chemistry") in commercial sugar of lead. Allowing 5 per cent. as a proper pharmacopœial limit of impurities (soluble and insoluble), of water and carbonic acid (as carbonate), the following pharmacopœial description may with advantage be introduced:

One gramme of lead oxide, dissolved in 5 Cc. of acetic acid, diluted with 5 Cc. of water, by means of a gentle heat, should require for complete precipitation at least 42.8 Cc. of the decinormal potassium bichromate solution, using silver nitrate solution as indicator.

The 42.8 Cc. of $\frac{N}{10}$ potassium bichromate will completely precipitate .95 Gm. of absolute lead oxide, and consequently indicates 95 per cent. in the sample.—Amer. Jour. Phar., Nov., 1897, 572–575.

Minium—Assay.—Forester proposes to estimate the impurities and the percentage of Pb_3O_4 in minium in the following manner; 10 Gm. of minium are treated in a flask, with 10 Gm. of ordinary sugar dissolved in 50 or 60 Cc. of boiling water, and 10 Cc. of nitric acid at 36°, until the red color has entirely disappeared. If there is much residue, the mixture must be heated for a quarter of an hour. The insoluble matter is collected on a tared filter and weighed. To estimate the Pb_3O_4, the author treated the 1 Gm. of the substance with acetic acid; this decomposes the oxide, leaving a residue of PbO_2: he used 10 Cc. of acid at 10°, and 20 Cc. of water, heated for half an hour on the water-bath, and collected the binoxide. The weight of this is determined either by direct weighing or titrimetrically by the iodine process.—Chem. News, May 27, 1898, 250; from Zeit. f. Ang. Chem., 1898, No. 11, 176.

White Lead—Comparative Value of the Pure Pigment and of its Mixture with Zinc White and Barytes.—L. D. M'Kee gives the results of some experiments made with different samples of white lead paint, which on analysis were determined to have the composition indicated in the following:

No. 1 contained: White lead, 40 per cent.; zinc white, 20 per cent.; barytes, 40 per cent.

No. 2 contained: White lead, 20 per cent.; zinc white, 40 per cent.; barytes, 40 per cent.

No. 3 contained: White lead, 98 per cent.; impurities, 2 per cent.

Three boards, all alike, were taken, and each board was painted three coats of paint, so that No. 1 had three coats of sample No. 1, No. 2 had three coats of sample No. 2, and No. 3 had three coats of sample No. 3. Extreme care was taken to have all the paints of the same consistency so as to make a fair test. These boards were all nailed side by side on the south side of an unprotected building, and the results noted. The exposure having been only for six months, the time was too short for the deterioration of any of the paints; but the pure paint (No. 3) had a more granular surface than the others, and showed the greatest disposition to "chalk."—Proc. Kansas Pharm. Assoc., 1897, 45.

TIN.

Tin—Action of Nitric Acid.—It is found by Engel that several different compounds are formed by the action of nitric acid upon tin, according to the degree of dilution of the acid, or the temperature at which the reaction takes place. Thus, ordinary nitric acid, diluted with twice its volume or more of water, and cooled to 0° C., dissolves the tin in the form of stannous nitrate, while if only one volume of water be added for dilution at the same temperature, stannic nitrate is formed as a syrupy liquid, from which this salt may be precipitated by excess of acid. If ordinary undiluted nitric acid be used, a white precipitate of the same salt, stannic nitrate, is produced at the ordinary temperature, and this is entirely soluble in water. Thus, the action of the acid upon tin does not differ from that on other metals; but the stannic nitrate so formed is decomposed by water or by heat, and is almost at once converted into stannic acid or a basic nitrate. The second of the above solutions gives a gelatinous mass when diluted with water, and the precipitate obtained from the third solution loses its solubility, and becomes converted for the most part into stannic acid. In the presence of water, or on drying, this becomes converted into meta-stannic acid, and by boiling the meta-stannic acid for several hours with water, para-stannic acid, $Sn_5O_{11}H_2,3H_2O$, is formed.—Pharm. Journ., Jan. 22, 1898, 67–68; from Compt. rend., cxxv., 709.

THORIUM.

Thorium Nitrate—Advantage of Crystals for Incandescent Mantles.—Fuhse states that thorium nitrate, which is used in the preparation of incandescent mantles, is a more reliable material when used in form of crystals than in the granular form in which it is now supplied. It is readily crystallized from water solution, forming large acute pyramids which have the composition represented by the formula $Th(NO_3)_4,6H_2O$.—Pharm. Journ., July 3, 1897, 4; from Ztschr. Angew. Chem., 1897.

URANIUM.

Uranium Salts—Toxicity.—In view of the proposed use of uranium nitrate in doses of 30 to 60 centigrammes thrice daily in the treatment of diabetes, Angermayer calls attention to the fact that, notwithstanding the close chemical analogy between uranium and iron salts, the salts of uranium are highly toxic, half a milligramme per kilogramme of body weight being quite sufficient to cause death.—Pharm. Journ., Oct. 30, 1897, 378; from Pharm. Ztg., xlii., 79.

VANADIUM.

Pervanadates—Preparation.—Anton Scheurer prepares barium pervanadate—$Ba(VO_4)_2$—by decomposing a saturated solution of ammonium meta-vanadate in water containing peroxide of hydrogen, by means of barium chloride solution. The barium pervanadate falls as a heavy amorphous yellow precipitate, which must be washed with water containing peroxide until all the ammonium chloride is removed, and then dried over calcium chloride. The barium pervanadate can be analyzed by measuring the oxygen split off on the addition of dilute sulphuric acid and slightly warming. The reaction is finished when the red color of the solution has changed to bright green. The vanadic acid present is titrated against standard permanganate solution. Various other pervanadates were also prepared and analyzed by the author, and are described in Ztschr. f. Anorg. Chem., 1898, No. 4.—Chem. News, April 29, 1898, 201.

ARSENIC AND ANTIMONY.

Arsenic—Formation and Uses of Soluble Double Salts.—See *Sodium Arsenic-Tartrate* under "Organic Acids."

Arsenic—Quantitative Separation from Antimony.—Oscar Piloty and Alfred Stock observe that the quantitative separation of arsenic, antimony, and tin is one of the most difficult problems of mineral analysis if the separation of each element is required; and they give a preliminary description of a method for the separation of arsenic from antimony which they believe to be calculated to solve this question with accuracy and expedition. The observation upon which the method depends is the volatility of arsenic with hydrogen sulphide in a strongly hydrochloric acid solution. This fact may perhaps throw a light on the causes of some of the many discrepancies observed in the precipitation of arsenic as sulphide. If arsenic tersulphide is heated with very strong hydrochloric acid until there is a brisk discharge of hydrochloric acid, the chief part of the arsenic escapes with moderate ease, and the yellow arsenic sulphide disappears almost entirely. Indeed, the experiments showed that from a solution of arsenic trioxide or pentoxide no sulphide is precipitated by sulphuretted hydrogen if it is heated to ebullition with a simultaneous introduction of gaseous hydrochloric acid. Under these conditions the arsenic distills away entirely in a short time from the solution, probably as trichloride.

From the foregoing it will be readily seen that the precipitations of arsenic can be accurate only if the solutions containing the metal are but slightly acid, or are not heated in presence of much hydrochloric acid. This condition must be emphasized the more because the authors can not find it mentioned in journalistic literature or in standard works on chemical analysis. Since other metals in the permanent presence of an excess of hydrochloric acid are not affected by hydrogen sulphide, the author undertook the task to apply the described behavior to arsenic for its quantitative separation from antimony, and obtained very accurate results.—Chem. News, Sept. 17, 1897, 137; from Berichte, 1897, No. 12, 164.

Arsenic and Antimony—Separation from Large Excess of Tin.—It is suggested that the decomposition of sulphurous acid into sulphuretted hydrogen when heated with stannous chloride, may be of practical use in separating small quantities of arsenic and antimony from a large excess of tin. For this purpose the solution is mixed with a little fresh stannous chloride solution strongly acidulated with HCl, and after it has been brought to boiling-point a solution of sodium sulphite is added drop by drop. The sulphides of arsenic and of antimony are precipitated. Sulphuric acid can also be tested for arsenic thus: 10 to 15 Cc. of the acid are diluted with an equal volume of water and added to a strongly acid solution of stannous chloride; after heating to boiling-point, a solution of sulphite is added drop by drop. When arsenic is present, the separation of the characteristic sulphide is distinctly apparent, while if none be present, the fluid is merely opalescent from the separated sulphur.—Pharm. Jour., March 26, 1898, 301; from Chem. Ztg. (Report), xxi., 322.

Antimony—Volumetric Estimation.—H. Causse describes a new method for the volumetric estimation of antimony, which is based on the fact that when antimonious acid, either free or combined, comes into contact with iodic acid, this latter is destroyed, and the antimonious acid is converted into antimonic acid, while a quantity of iodine proportional to the amount of iodic acid decomposed is set free. The reaction occurs according to the equation: $5Sb_2O_3 + 2I_2O_5 = 5Sb_2O_5 + 2I_2$.—Chem. News, Jan. 21, 1898, 36; from Compt. rend. (No. 25), Dec. 20, 1897.

Antimonic Acids—Existence of Two Forms.—Fémy has described two antimonic acids and their salts, but the existence of more than one is disputed by many chemists. Delacroix has now taken up the study, and is convinced that there are really two: pyroantimonic acid, giving acid pyroantimonates and neutral salts; and orthoantimonic acid, giving acid, neutral, and basic salts. The solution of pyroantimonic acid was prepared from the hydrate by pouring $SbCl_5$ into 20 or 25 times its weight of cold water, or by treating $SbCl_3$ (previously dissolved in a little water), in the same manner, then saturating with chlorine. The excess of chlorine is driven off by a current of air directed on the mixture. After standing an hour or two, the hydrate is transferred to a filter, washed a little, and pressed strongly between blotting-paper. It retains a little HCl very tenaciously, but not more than if it had been washed for a much longer time. The hydrate is then placed in cold water, in which it slowly dissolves. The solution, which is colorless, is evaporated to dryness and calcined, forming Sb_2O_4, from the weight of which the amount of anhydride is calculated. Pyroantimonic acid, when warmed for some time at 100° C., becomes transformed into the more basic orthoantimonic acid. The same transformation takes place spontaneously at the ordinary temperature in a few days. The solutions thus prepared are slightly opalescent. The author intends studying the basic orthoantimonates and the neutral pyroantimonates, which are new salts. — Chem. News, Nov. 12, 1897, 241 ; from Jour. de Pharm. et Chim. (6) vi. (1897), No. 8.

Sulphantimonites of Potassium—Preparation, Characters and Forms.—Pouget describer three definite sulphantimonites of potassium, viz., normal, pyro-, and meta-sulphantimonite of potassium, and a lower body to which he assigns the formula $Sb_4S_7K_2$. The normal salt,

Normal Sulphantimonite of Potassium, SbS_3K_3, has not previously been isolated. It is readily obtained by dissolving sulphide of antimony in a concentrated solution of potassium sulphide in the molecular proportion, $Sb_2S_3+3K_2S$. The solution is evaporated, avoiding contact with air until small white crystals are deposited ; these, when dried *in vacuo*, are found to be the normal sulphantimonite. They are very deliquescent and rapidly decompose in the air.

Metasulphantimonite of Potassium, SbS_2K, is prepared in a similar manner, using the component salts in the molecular ratio, $Sb_2S_3+2K_2S$. In the cold *in vacuo*, the

Pyrosulphantimonite of Potassium, $Sb_2S_5K_4$, is primarily formed, and this is simply the additive product of the molecules named. On warming this it is decomposed thus : $Sb_2S_5K_4=SbS_2K+SbS_3K_3$. The metasulphantimonite of potassium is deposited as small reddish octahedral crystals, which are stable in the air, and insoluble in cold water, which scarcely affects them, while boiling water readily decomposes them. The mother liquors contain, and will yield on evaporation, the normal sulphantimonite, SbS_3K_3.—Pharm. Journ., July 31, 1897, 81 ; from Compt. rend., cxxiv., 1445.

BISMUTH.

Bismuth—Therapeutic Value of Its Organic Salts.—In continuation of his researches on the therapeutic value of the organic bismuth salts, Dr. Wilcox finds the following to be valuable remedies :

Bismuth-Naphtholal, a compound of bismuth oxide with β-naphthol, containing 20 per cent. of the latter, has given excellent results in case of typhoid fever, intestinal putrefaction, and in the diarrhœa of phthisis, the daily doses being from 60 to 120 grains.

Bismuth Tribromocarbolate has been found useful in gastrie fermentations in daily doses of 90 to 120 grains.

Bismuth Tetraiodophenolphthaleinate ("*Eudoxine*") has been found useful as an intestinal disinfectant.—Pharm. Journ., Dec. 18, 1897, 542; from Med. Chron., vii, 452.

Bismuth Subnitrate—Use for Preservation and Improvement of Cider.—According to L. Defour and Daniel, the addition of 10 grammes of bismuth subnitrate to each hectoliter of cider prevents, or materially retards, the hardening of the beverage on exposure to air during use from casks, and, at the same time, renders alcoholic fermentation more complete.—Pharm. Journ., Mar. 26, 1898, 302; from Compt. rend. cxxv, 1125.

MERCURY.

Mercury—Action of Sulphuric Acid at Ordinary Temperatures.—P. E. Berthelot has observed that concentrated sulphuric acid is not, as is usually supposed, entirely without action on pure metallic mercury at ordinary temperatures. He finds, on the contrary, that gradual and evident evolution of gas is observed on placing the concentrated acid in contact with the metal, and after the lapse of a few days, and still more at the end of a couple of months, notable quantities of mercurous sulphate will have formed, as well as sulphurous anhydride. The presence of a trace of water arrests the action.—Pharm. Journ., Feb. 19, 1898, p. 163; from Comptes rendus, cxxv., 749.

Mercury—Action of Sulphuric Acid.—The statement of Baskerville and Miller, that mercury decomposes concentrated sulphuric acid at about 20° C., is controverted by J. R. Pittman, who was unable to obtain any such result when the acid and metal were left in contact for forty-eight hours, or when they were violently shaken together in the proportion of one part by volume of the metal to seventy of the acid. The opinion is expressed that no reaction can take place between mercury and sulphuric acid at the ordinary temperature, and that if the experimenters before mentioned noted any reaction, the conditions must have been other than as stated by them. —Journ. Amer. Chem. Soc., 1898, 100.

Mercury—Separation from Bismuth Salts.—According to Vanino and Treubert, the separation of mercury and bismuth salts can be accomplished by adding to a slightly acid solution of the mixture of mercuric chloride and bismuthic oxychloride an excess of a solution containing hypophosphorous acid and hydrogen dioxide—1 drop of the former to 1 Cc. of the latter. The mercury separates in about an hour as calomel, which is filtered off, washed with dilute hydrochloric acid and cold water, and dried at 105° C. To obtain the bismuth from the filtrate and washings, caustic soda is added to alkalinity, the liquid is warmed, and a further quantity of hypophosphorous acid added, when metallic bismuth will be precipitated. Pharm. Journ., Feb. 26, 1898, 183; from Berichte, *31*, 129.

Calomel—Inquiry Into Its Conversion into Corrosive Sublimate When Kept in Form of Tablets.—Ernest L. Ozias communicates in some detail experiments made to determine to what extent, if at all, calomel is converted into corrosive sublimate when kept in admixture with various ingredients usually prescribed in tablet form. His experiments point to conclusions, which he summarizes as follows:

I. Vegetable acids offer little or no incompatibility.

II. The normal juices of the stomach do not decompose calomel.

III. The indiscriminate dispensing of calomel with soda may be open to serious question.

IV. Vegetable drugs, such as ipecac., etc., are not detrimental to the healthy action of calomel.

V. Santonin acts as a remarkable check to the decomposition of calomel.

VI. The alkali chlorides affect calomel NH_4Cl most, KCl less, and salt practically not at all.

VII. Calomel is most strongly acted on by pancreatin. If the decompositions were to $HgCl_2$ mostly, there could be little short of disastrous consequences attending its use. It probably changes the drug into several soluble compounds of Hg, which in small quantities do not tend to produce deleterious effects.—Proc. Kansas. Pharm. Assoc. 1897, 45–48.

Corrosive Sublimate—Solubility in Ether.—Madsen points out that the statements as to the solubility of corrosive sublimate are frequently incorrect. Thus, the Danish Pharmacopœia states that it is soluble in four parts of ether, and similar statements occur in several other pharmacopœias and manuals of chemistry. He has experimented and ascertained that a saturated solution of corrosive sublimate in ether contains one part of the sublimate, in eight parts of the solution.*—Pharm. Journ., July 31, 1897, 83; from Arch. for Pharm. og Chemi, 1897, No. 12.

Mercurous Iodide—Question of Color.—The ever recurring question of the proper color of mercurous iodide has engaged the attention of François, who finds that pure amorphous mercurous iodide, precipitated and washed in the dark, is of a bright yellow color, resembling the tint of lead chromate. The yellowish-green preparations of commerce were all found to contain an excess of free mercury, and the varying tints of other samples could be reproduced by mixing pure, bright, yellow mercurous iodide by trituration with the indicated excess of metallic mercury.—Pharm. Jour., Jan. 29, 1898, 87; from Journ. de Pharm. et de Chim. (6), vi., 529.

Mercuroso-Mercuric Iodide—A Mixture and Not a Compound.—Maurice Francois has repeated the experiments of Boullay, who first prepared what he claimed to be intermediate mercury iodide, Hg_4I_6, and whose statement has been accepted in all works on chemistry since 1827. The author finds that the so-called salt is nothing but a mixture, separable by treatment with ether into mercurous and mercuric iodide. The mercurous iodide left insoluble by this solvent was found to be of a bright yellow color. By fractionally precipitating a solution of freshly-prepared mercurous nitrate with a solution of iodine in iodide of potassium of the strength prepared by Boullay, it was further found that the first three fractions consisted entirely of mercurous iodide and the remainder chiefly of the mercuric salt. Further, that when recently precipitated mercuric iodide was placed in contact with excess of mercurous nitrate solution, yellow mercurous iodide was slowly formed according to the equation $HgI_2+2HgNO_3=Hg_2I_2+Hg2NO_3$. On the other hand, when mercurous iodide was treated with a solution of mercuric nitrate, the red iodide is formed thus:

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* Presumably the Official Ether of the Danish Pharmacopœia.

$$Hg_2I_2+Hg2NO_3=HgI_2+2HgNO_3.$$

These separate reactions explain the successive formation of mercurous and mercuric iodide under the conditions indicated by Boullay as leading to the formation of the intermediate salt.—Pharm. Journ., Jan. 22, 1898, 68; from Journ. de Pharm. [6], vi, 443.

SILVER.

Ammoniacal Silver Bromides—Formation and Dissociation—Jarry has observed that when submitted to the action of liquefied ammonia gas, dry bromide of silver loses its yellow color and is transformed into a white powder; the excess of liquid is evaporated off, keeping the temperature at —30°. If now the temperature be gradually raised, at about +4° an abundant disengagement of ammonia is observed, though the powder still remains white; towards +35° another disengagement of ammonia gas takes place, and this time the bromide returns to its original yellow color.—Chem. News, June 3, 1898, 261; from Comptes rendus, cxxvi., No. 16.

Fused Silver Nitrates—Commercial Quality.—Prof. W. A. Puckner reports the results of the examination by his students of four samples of silver nitrate. A sample of "fused silver nitrate in sticks" seemed to be fully up to the pharmacopœial standard, so far as the silver content and freedom from chloride is concerned, but gave evidence of traces of iron and lead. A sample of "dilute silver nitrate," which should contain 67 per cent. silver nitrate, showed 66.87 per cent. by the gravimetric process of assay, and 67.13 per cent. by the volumetric. It contains a mere trace of lead, but no other impurities. Two samples of lunar caustic cones mounted on wooden holders with cups contained respectively 88.2 and 74.24 per cent of silver nitrate, and gave evidence of considerable quantities of potassium—evidently nitrate. One of the samples contained a trace of iron, the other a trace of lead.—Proc. Ill. Pharm. Assoc., 1897, 72.

GOLD.

Gold—Determination in Ores.—It is stated in "Swed. Teknisk. Tid." that the gold present in auriferous ores can be rapidly and safely determined by the following method, which is applicable to all kinds of ores: —75 Gm. of borax (anhydrous), the same weight of crude tartar, and 50 Gm. of red lead are mixed; 250 Gm. of the pulverized ore are then added, along with 100 Gm. of potash. This mixture is placed in a J crucible, and above it is spread a stratum of 75 Gm. soda, and over this again a layer of sodium chloride 1.5 Cm. in thickness; last, 50 Gm. of red lead. The crucible is placed in a gas furnace, cautiously heated, at last strongly enough to bring it to the state of quiet fusion. The melted mass is poured into a conical form, at the bottom of which it arrives as a lead regulus, which after treatment is cupelled in a muffle furnace. If the ore contains no silver, a little silver free from gold is added. The globule of silver—possibly auriferous—is treated with nitric acid. The silver dissolves, and the residual gold is weighed.—Chem. News, Dec. 31, 1897, 322; from Chem. Zeitung.

PLATINUM AND PALLADIUM.

Platinum—Action of Phosphates Under Ignition in Presence of Organic Matter.—W. G. Stratton observed that while igniting a mixture of ammonium phosphate and Rochelle salt on platinum wire before the blow-pipe, the platinum began to fuse and became quite brittle. Subsequently he was informed by a scientific friend that a similar action had been observed by the latter upon heating charcoal, which contained phosphate as an impurity, in a platinum crucible. This action seems to be little known, and is doubtless due to phosphorus produced by reduction of the phosphate by the carbon from the tartrate.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy) 1897, 427.

New Platinous Double Salts—Condition of Formation.—According to Vezes, the limited action of hydrochloric, hydrobromic, or hydriodic acids upon potassium platino-nitrite, $Pt(NO_2)_4K_2$, gives rise to the elimination of half the nitrous acid contained in this salt, and to the formation of mixed chloro, bromo, or iodo-nitro salts very stable in aqueous solution; the platino-dichloro-nitrite, $PtCl_2(NO_2)_2K_2$; lastly, the platino-diiodo-nitrite already obtained by Nilson. Oxalic acid gives rise to an analogous reaction, with the sole difference that, by reason of its basicity, a single molecule of acid in place of two intervenes in the reaction. The properties of potassium platino-oxalonitrite are capable of being utilized in the separation of the platinum metals.—Chem. News, Oct. 29, 1897, 219; from Compt. rend. cxxv (1897), No. 15.

Potassium Platinochloride—Dissociation in Very Dilute Solution.—E. Sonstadt points out that while a solution of potassium platinochloride in 1000 parts of water undergoes no sensible change on heating for an hour or two, a solution in 10,000 parts of water becomes turbid almost immediately on heating, the turbidity increasing until, after some hours, the liquid becomes nearly opaque. Continued heating during some days, the bulk of the solution being maintained by the addition of water from time to time, results in the formation of a sediment and partial clearing of the liquid, and that clearance is facilitated by increasing the quantity of water during the heating process. In the first place the potassium platinochloride appears to be dissociated, and the resulting platinic chloride is then decomposed, with formation of platinum monochloride, hydrochloric acid and hydrogen peroxide. The yield of the monochloride in the experiments described was about five-eighths of that theoretically obtainable.—Pharm. Journ., Feb. 18, 1898, 163; from Proc. Chem. Soc., 188, 25.

Platinum and Palladium—Compound with Carbon Monoxide.—According to E. Harbeck and G. Lunge, both platinum and palladium form with carbon monoxide a compound which is stable enough to be called a true chemical compound. One reason advanced in favor of this view is that the carbon monoxide cannot be displaced by another gas, whilst the quantity of it taken up is unaffected by previous treatment of the metal with hydrogen. Again, on heating the compound of Pt and CO to 250° C., the gas is given off suddenly, while a third reason for assuming the chemical nature of the compound is that, when it exists, the free surface of the metal is prevented coming in contact with ethylene and hydrogen that may be passed over it, and the reaction which normally takes place—expressed by the equation $C_2H_4 + H_2 = C_2 + H_6$—is also prevented.—Pharm. Journ., Mar. 26, 1898, 301; from Zeit. f. anorg. Chem., Jan. 18, 1898.

Palladium—Existence of a Hydride.—John Shields communicates the results of a research to determine the conditions under which hydrogen is occluded by metallic palladium. There are three theories put forward generally to explain this phenomenon, viz.: 1. The hydrogen is liquefied and contained in the capillary pores of the metal. 2. The hydrogen is dissolved by the palladium, and the phenomenon is one of solid solution. 3. The hydrogen is chemically combined with palladium to form a definite hydride. The first and second theory are disproved by the arguments brought to bear on them by the author, who, by an elaborate series of electro-chemical experiments, has become convinced of the existence of a definite

Palladium Hydride. His research did not quite clearly prove the actual formula for the palladium hydride, but there is good reason to believe that it is Pd_3H_2, and not, as has been previously stated by Troost and Hautefeuille, Pd_2H.—Pharm. Journ., 1898, 281.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(*Including Volatile Oils.*)

Carbon Compounds Used in Medicine.—Classified Description.—Marston Taylor Bogert observes that during the past decade the market has been flooded by a perfect deluge of carbon compounds, mainly of synthetic origin, and for use in nearly all the ills to which the flesh is heir. In the many attempts to classify this ever increasing mass of material, many valuble data bearing upon the relation between chemical structures and physiological action are entirely lost sight of. He has, therefore, prepared a paper with the object of presenting a classification of these carbon compounds, which shall be based upon chemical structure, and indicating briefly their physiological action, so that, when possible, we may more clearly see the relation between the two. The list embraced by this paper does not profess to be complete, but aims to discuss those compounds of carbon which have more than passing interest, and may be consulted in Merck's Report, April 1, 1898, 198, et seq.

Benzinum U. S. P.—Correction of Specific Gravity.—Edward Kremers points out that in the official definition of benzinum or petroleum ether the limits of boiling point and of specific gravity do not harmonize, the former being given as 50° to 60° C., while the specific gravity is given as 0.670 to 0.675 at 15° C. Assuming that what the Pharmacopœia wants is a fraction of American petroleum which passes over between 50° and 60° C. in the process of purification by distillation, he finds, after careful experiments which he records, that such a fraction is easily obtained of uniform specific gravity, but that the specific gravity is 0.657 to 0.658. If, therefore, benzinum is to be retained in the next edition of the U. S. P., the necessary corrections ought to be made, based upon more experimental evidence than is now at hand.—Phar. Review, June 1898, 221–223.

Nitrobenzene—Properties.—A drum of nitrobenzene having crystallized during the severe winter of January, 1896. Richard J. Friswell succeeded in removing from it a large, tabular, transparent crystal, 2½ inches long, 1 inch broad, and 3/8 inch thick, weighing over 15 Gm. It was irregular, had no faces, and resembled a mass of ice in appearance. The author took advantage of this circumstance to determine some of its properties, with results which he summarizes as follows: The specific gravity of solid nitrobenzene d 1.5° 4° is 1.3440, whilst for liquid nitrobenzene it is d 3.8° 4°, 1.2220; d 13° 4°, 1.2116; d 28° 4°, 1.1931. Expansion on fusion, 0.099837. Contraction on solidification, 0.099837. Boiling point at 760 Mm., 209° corrected (that is, with column immersed in the vapor). Nitrobenzene is remarkable as giving a strongly colored vapor, resembling that of diluted chlorine, visible in a layer of 2 inches, and very marked in a layer of 6 or 8 inches. The vapor does not exhibit a banded spectrum when examined by transmitted light.—Chem. News, Sept, 24, 1897, 149; from Trans. Chem. Soc. 1897.

α-Naphthol—Method of Distinction from β-Napthol.—E. Leger, on the basis of some observations made upon the action of sodium hypobromite on certain phenols, recommends the following test for the distinction between *α*- and *β*-naphthol. A saturated aqueous solution of the supposed mixture being prepared, this solution, when diluted with its own volume of water, will not give the *β*-naphthol reaction with 3 drops of hypobromite; but if the substance under examination contain *α*-naphthol we get a violet or violet-rose coloration. By this means it is easy to detect 1 part of *α*-naphthol in 100 parts of *β*-naphthol.—Chem. News, July 16, 1897, 35; from Journ. de Pharm. et Chim. (6), v., No. 11.

Asaprol (Calcium Sulphonate of β-Naphthol)—A Convenient Reagent for Albumin in Urine.—Riegler recommends the following reagent for determining albumin in urine; Asaprol calcium sulphonate of *β*-naphthol), 8.0; citric acid, 8.0; water, 200. From 15 to 20 drops of this reagent—which may be kept for any length of time without alteration—is mixed with about 10 Cc. of the urine previously acidified. The albumen is completely precipitated, considerable quantities being evidenced by the distinct precipitate formed, whilst mere traces are indicated by distinct turbidity. The method may be applied for quantitative determinations. A mixture of asaprol and citric acid may conveniently be kept in form of a dry powder, to be dissolved in water as required.—Pharm. Centralh. xxxviii. (1897), 349.

Medicinal Petroleum—Presence and Tests for Sulphur Compounds.—F. C. J. Bird directs attention to the frequent presence of some form of sulphur in commercial samples of medicinal petroleum, such as *paraffinum liquidum* and *paraffinum molle.* Though these may be originally odorless, the presence of this sulphur compound interferes with their keeping properties, and readily manifests itself when the samples are emulsified along with a pure hypophosphite, when, after a time, a strong sulphuretted odor is developed. Among the principal tests that are available for the detection of sulphur—six are discussed by the author—the one depending on the reduction of the sulphur compound with Zn and HCl is convenient, easily applied, and delicate. One drachm of the petroleum oil or jelly is shaken in a test tube with 72 drachms of absolute alcohol; 15 minims of pure HCl and a fragment of pure zinc are added, and a strip of paper wetted with a solution of lead subacetate is suspended in the upper part of the tube—spurting being prevented by a plug of cotton beneath the paper. The presence of sulphur compound is indicated by the paper turning brown or black. The hydrogen evolved in contact with pure oils has a pleasant ethereal odor, which the presence of a slight trace of sulphur modifies in a marked degree. From the examination of a large number of samples, the author arrives at the following conclusions:

White Petroleum Oil having a sp. gr. of about 0.885 can be obtained more free from taste and odor than lighter oils, but it is evident that the bulk of the white oil found in commerce, much of which is sold as chemically pure, contains sulphur.

White Petroleum Jelly is frequently a mixture of ceresin and white oil, and partakes of the impurities of the latter. Very pale jellies, which are true non-crystalline petroleum residues, generally contain sulphur, which, as in the case of white oil, are probably due to a process of bleaching.

Yellow Petroleum Oils, although generally free from sulphur, are in many cases so tainted with a "paraffin" flavor as to be unfit for internal use.

Yellow Petroleum Jellies, as far as sulphur is concerned, are the purest, samples being now met with which are fairly pale in color, contain no sulphur, and are both tasteless and odorless.

The physical characters of a few typical samples, together with their behavior towards the before-mentioned reduction test, and a "litharge test," are given in the following table, the litharge test being as follows, but answering satisfactorily only with white petroleums: One fl. dr. of the petroleum and ½ fl. dr. of absolute alcohol are well shaken together in a test tube, 2 drops of a litharge solution (made by boiling an excess of litharge in a solution of 1½ dr. caustic soda and 10 fl. dr. water and decanting clear) are added, and the mixture is again shaken a few seconds. The mixture then quickly assumes a deep orange tint with very impure oils, and according to the amount of impurities present passes through all the gradations of orange and yellow up to white with pure oils.

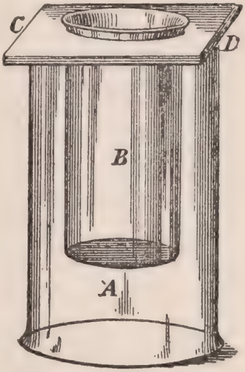
White Petroleum Oils.

No.	Sp. Gr.	Color.	Odor.	Taste.	Litharge Test.	Reduction Test.
1	.865	Water white	Odorless	Castor-oil-like	Very deep orange	Black
2	.880	"	"	Tasteless	Very deep orange	"
3	.885	"	"	"	Pale yellow	Pale brown
4	.885	"	Faint odor	Castor-oil like	Yellow	Brown
5	.875	"	"	Nutty taste	Orange	Deep brown
6	.885	Faint straw	"	Faint, disagreeable	Very pale yellow	Very pale brown
7	.870	Water white	"	Faint, disagreeable	Orange	Deep brown
8	.865	Faint straw	"	Faint taste	Orange-yellow	Brown
9	.875	"	"	"	Full orange-yellow	Deep brown
10	.885	Water white	Odorless	Tasteless	Full orange-yellow	"
11	.870	"	"	"	Orange-yellow	Brown
12	.885	"	"	"	Very deep orange	Black
13		"	"	Faint, agreeable flavor	Colorless	No coloration
White Petroleum Jelly.						
14		White	Odorless	Faint, nauseous taste	Orange	Brown
15		"	"	Tasteless	No coloration	No coloration
16		Very pale yellow	"	"		Pale brown
Yellow Petroleum Oil.						
17	.890	Full yellow	Slight petroleum	Marked petroleum		No coloration
18	.885	Pale yellow	Very faint	Tasteless		"
19	.870	"	Faint, agreeable	"		"
20	.890	Full yellow	Faint	Marked petroleum		"
Yellow Petroleum Jelly.						
21		Full yellow	Odorless	Tasteless		No coloration
22		Yellow	"	"		"
23		Pale yellow	"	"		"

—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1897, 409–414.

Paraffin—Determination of Congealing Point.—R. Kissling recommends a simple method for determining the congealing point, which is less liable to error than those in common use. The special apparatus necessary is shown by Fig. 84. *A*, is a glass cylinder about 8 Cm. wide and 12 Cm. high, supporting a wooden or mill-board plate, *C D*, pierced at the center with a hole for the insertion of the small beaker, *B*, supported by the rim, and about 8 Cm. high and 5 Cm. in diameter. About 50 Gm. of paraffin, previously clarified by filtration, if necessary, are placed in *B* and heated to about 10° C. above the congealing-point in a water-bath, whereupon the beaker is placed in position as shown in the figure, and the contents stirred with a small-bulbed thermometer, graduated from 20° to 80° C., until a film of solid paraffin forms on the bottom of the beaker, when the temperature is read from the thermometer-stirrer. The solid film is detected by the marks made in it by the bulb of the thermometer during the stirring, and is easily observed through the sides of the apparatus. A skin forms immediately on the surface, and the previously clear liquid becomes flocculent. The results so obtained are concordant to within $\frac{1}{10}$° C. of the mean, the entire operation lasting only from 10 to 12 minutes.—Merck's Rep., June 15, 1898, 369; from Jour. Soc. Chem. Ind., xvii., 380.

FIG. 84.



Ichthyol—The Source of a New Class of Preparations.—Helmers has made investigations which have shown that the principal constituent of ichthyol, ichthyolsulphonic acid, possesses the property for endering a second constituent of ichthyol, which is oily, aromatically odorous and sulfon-like, soluble in water; this solvent, which the author has named

Amytin, in its turn has the property of dissolving a third body contained in the ichthyol, which under ordinary conditions is insoluble, the resultant solution being designated by the authors as

Amytol.—The solvent power of amytin is, however, not confined to this third ichthyol constituent, but it dissolves volatile oils, camphor, phenols, and other bodies with equal facility. The solutions so effected are designated by the general name of amytols. The solvent, amytin, contains 33 per cent. of ichthyolsulphonic acid, in aqueous solution, to which Dr. Unna refers the principal remedial value of these preparations.—Pharm. Centralh. Oct. 28, 1897, 716.

Ichthyol—Use in Eye Diseases and in Scarlet Fever.—It is stated in "Pharm. Centralh." (xxxviii. 359) that ichthyolh as proven effective as an application in the treatment of diseases of the conjunctiva, its action being that of an astringent and anodyne, as well as an antiseptic. It is applied either in form of ointment made with petroleum, or in the form of a 30 to 50 per cent. aqueous solution. Another field of usefulness for ichthyol appears, according to "Practitioner," to be in the treatment of scarlet fever. While it does not appear to have any specific action on scarlet fever, the local application of a 5 per cent. ointment of ichthyol has a most beneficial effect in allaying the irritation of the skin, producing a rapid decline of the fever, and improving the general condition of the patient.—Pharm. Journ., Sept. 25, 1897, 294.

Ichthyol—A Serviceable Remedy for Insect Bites.—Ottinger recommends moistening the parts bitten by insects with ichthyol or, better, to apply a plaster of ichthyol. He finds the remedies usually applied—such as ammonia, compresses of moist earth, vinegar, cold water, etc., quite useless for the purpose.—Pharm. Journ., Oct. 2, 1897, 297; from Umschau, i. 434.

Ichthyol—Use in Phthisis.—Dr. Frenkel has used ichthyol with much benefit internally in various stages of tuberculosis, giving it immediately before meals in doses of 50 centigrams four times a day in 50 per cent. solution flavored with a little oil of peppermint, or in form of capsules containing 25 centigrams each. He found that in most cases the cough disappeared in a short time, the expectoration being rendered more easy, night-sweats disappeared or were diminished, and the general health was improved. In general the beneficial action of ichthyol was found by the author to surpass that of either guaiacol or creosote.—Pharm. Journ., Oct., 23, 1897, 359; from Therap. Woch.

Desichthol—Ichthyol deprived of its Odorous Volatile Oil.—It is stated in "Pharm. Ztg." (1898, 155), that when ichthyol is distilled with steam it loses about ½ per cent. of an odorous volatile oil, and the residue, now called "desichthol," is comparatively odorless. The chemical and therapeutical properties remain to be determined, but if the latter are not impaired by the treatment, desichthol may prove a useful addition to medicine.

Ichthallin (Ichthyol-Albuminate)—A New Remedial Agent.—A compound of ichthyol and albumin has been introduced under the name of "ichthallin," which is made, according to Vieth, by precipitating an aqueous solution of albumin by means of ichthyol. It constitutes a very fine greyish-brown, tasteless, odorless and insoluble powder, which, passing undissolved in the stomach, is gradually decomposed by the gastric juice into its component parts—ichthyol and albumin. The ichthyol so liberated acts beneficially in stimulating the tone and manifests aperient and antiseptic properties, and the remedy has proven useful in anæmia, rachitis, scrofula and intestinal catarrh, being administered to adults in doses of 1 to 2 grammes.—Pharm. Post, xxx, 293.

Anytoles—A New Class of Sulphonates of Hydrocarbons.—Starting from the fact that in investigating the composition of ichthyol it was found that sulphonates of hydrocarbons possess the property of making soluble in water substances which before were insoluble, Dr. F. Loeffler has prepared a series of what he calls anytoles. The ammonia salt of hydrocarbons containing 10 per cent. of chemically combined sulphur is the most suitable to use. The following are some of the anytoles which have been prepared: Phenol-anytole, cresol-anytole, meta-cresol-anytole, creosote-anytole guaiacol-anytole, benzene-anytole, eucalyptol-anytole, peppermint-anytole, wintergreen-anytole, turpentine-anytole, camphor-anytole, and iodine-anytole—all containing a good proportion of the active ingredient with anytin (the name Hehners gives to the ammonia salt of the sulphonated hydrocarbon). The obviously great advantage of having active disinfecting agents in a soluble form has resulted in a series of experiments to determine the bactericidal powers of anytoles, and has proved the superiority of the anytoles over the disinfecting substances they contain. The two preparations, cresol-anytole and anytin, may prove advantageous in the local treatment of diphtheria, as the diphtheria streptococcus is readily affected bv these agents, which have, however, very little action on the mucous membranes. Clinical trials which are being made are of great promise from a therapeutical point of view.—Chem. and Drugg., May 28, 1898, 881.

Acetylene—Impurities and Reactions.—A. Denaeyer's investigations upon acetylene show that the gas prepared from calcium carbide contains hydrogen sulphide and ammonia, but neither hydrogen arsenide or phosphide. The gas may be purified by passing it through sawdust which has been saturated with calcium hydrate and a saturated solution of ferrous sulphate. Thus purified it does not blacken bright copper surfaces; gives a white precipitate with mercuric chloride; reduces gold chloride to the metal; yields a chestnut-brown precipitate with ammoniacal solution of cuprous chloride; a black precipitate with mercuric nitrate; a voluminous white precipitate with silver nitrate, insoluble in nitric acid, and also in excess of ammonia, which turns it yellow. It produces a white precipitate with Nessler's reagent, and discolors solutions of potassium permanganate and of iodo-iodide of potassium, but gives no reaction whatever with the following: stannous chloride, lead acetate, cupric sulphate, cupric ammonio-sulphate, ammonio-cupric oxide, ammonio-cupric chloride, and ferric chloride.—Pharm. Centralh, Sept. 16, 1897, 606.

Acetylene Gas—Limit of Danger as an Illuminant.—It is stated in "Chemical News" (October 8, 1897, 180), that the Explosive Department of the British Home Office has recently had under consideration the question of the restrictions to be applied to the manufacture and keeping of acetylene gas, and has conducted various experiments with the object of gaining information on this matter. The results show conclusively that acetylene gas, *per se*, when under a pressure of something less than two atmospheres, is violently explosive; whereas at a pressure of less than one and a half atmospheres it appears to be reasonably free from liability to explosion, provided it be not admixed with oxygen or atmospheric air.

For commercial and practical purposes it is considered sufficient to allow a pressure of 20 inches of water above that of the atmosphere (*i. e.*, roughly, about one and one-twentieth atmospheres), and it is accordingly proposed to draw the safety line at this point, and to declare acetylene when subject to a higher pressure to be an "Explosive" within the meaning of the Explosives Act, 1875. In France and Germany the authorities have fixed the limit of danger at one and a half and one and one-tenth atmospheres respectively, and have imposed prohibitions or restrictions on the keeping or manufacture of the gas when it is at a higher pressure.

Acetylene—Use as a Quantitative Reagent for Copper.—According to H. G. Söderbaum, acetylene may be usefully employed for the quantitative determination of copper. A few Cc. of ammonia solution having been added to a solution of the copper salt in one or two hundred times its weight of water, the mixture is heated on a water-bath and acetylene is introduced to saturation. The precipitation is complete even in the cold, but takes place more quickly when heated, becomes more compact, and is less liable to adhere to the sides of the vessel. The copper acetylide is *immediately* collected, washed, and decomposed by digestion for half an hour with diluted nitric acid—avoiding a large excess—filtered from the carbonaceous residue and the filtrate evaporated to dryness and ignited. The ash of the filter and residue is also taken and the whole weighed as CuO; separate ignitions of the filtrate and of the insoluble residue being advisable to prevent explosions. The method is particularly useful for the separation of zinc and copper, the salts of zinc not being decomposed by acetylene. The copper compound with acetylene slowly redissolves on exposure to air; hence, the necessity of immediate collection and washing, though in a closed flask it may be preserved for any length of time. The acid originally combined with the copper is easily determined in the filtrate from the acetylene-copper precipitate.—Pharm. Centralh., July 1, 1897, 426.

Acetylene—Precaution in Chlorination.—Mouneyrat has found that a mixture of acetylene and chlorine, exposed to diffused light, always combines to form acetylene tetrachloride without explosion—provided that oxygen, or any gas that might produce oxygen, is absent. If, however, such a gas be present, an explosion occurs, which the author attributes to the formation of acetylene monochloride, which takes fire directly it comes in contact with air.—Pharm. Journ., June 25, 1898, 568; from Bull. de la Soc. Chim. de Paris, (3), xix.–xx., 448–452.

Acetylene Di-iodide and Ethylene Tetra-iodide—Preparation by Means of Calcium Carbide.—According to Biltz the compound C_2I_4—tetra iodo ethylene, and C_2I_2—di-iodo acetylene—are formed when calcium carbide is introduced into a solution of iodine in potassium iodide. Fifty grams of iodine are dissolved by the aid of heat in a concentrated aqueous solution of potassium iodide, and the solution is cooled to about 0° C. Small portions of coarsely powdered calcium carbide are then added very gradually under continued stirring. The products of the reaction are ethylene tetra-iodide, produced according to the equation: $C_2Ca + 6I = C_2I_4 + CaI_2$, and

Acetylene Di-Iodide, which is produced according to the equation: $C_2Ca + 4I = C_2I_2 + CaI_2$. The latter, which is readily separated in form of colorless, soluble needles, readily soluble in most solvents, is stated by the author to be virulently poisonous to micro-organisms, and one of the most active preventatives of decomposition.

Ethylene Tetra-Iodide, on the other hand, forms yellow, non-volatile and odorless crystals, which dissolve with more difficulty than the acetylene compound. It has been recommended under the name of

Di-Iodoform as a substitute for iodoform, and is said to be quite as efficient in its healing influence on wounds, while possessing the advantage of being odorless.—Pharm. Ztg., *42*, 1897, 448.

Essential Oils—Precaution in the Determination of Ester and Alcohol.—E. J. Parry, referring to his method of estimating the santalol in santalwood oil by the acetylization process, observes that some experimenters have failed to take into account the fact that santalwood oil contains constituents which retain potash when boiled with it in alcoholic solution—in other words, that santalwood oil has a small saponification number. This must be allowed for in calculating the amount of acetic acid entering into combination with the santalol from the saponification figures of the acetylized oils, else an error of at least 3 to 5 per cent. in the santalol is made. Similar mistakes, often small in actual amount, but still of importance, occur in other ester and alcohol determinations. Thus a simple potash hydrolysis is the basis for estimating the amount of linalyl acetate in bergamot oil. Campolo has shown, however, that the non-volatile residue (at 100° C.) of bergamot oil has a saponification number equivalent to from 1 to 2 per cent. of linalyl acetate, and proposes to deduct the saponification number of this residue from that of the oil before calculating the linalyl acetate. It is uncertain, however, whether a portion of this residue is not the result of change during the evaporation. Similar remarks apply to lavender oil, and to oils generally which contain some of the least stable of the compounds of the geraniol group. In peppermint oil the action of potash on acetaldehyde, valeric aldehyde, acetic acid, isovaleric acid, and the lactone ($C_{10}H_{16}O_2$) which Power and Kleber found in the oil, may be fairly considered to influence the result, seeing that, for example, potash combines with valeric aldehyde to form potassium valerate, and hydrolyzes lactones with the formation of potassium salts.

To partly meet these errors it is a fairly simple matter to actually estimate the acetic acid present in the case of acetic esters, or of that combining with alcohols in the case of these bodies existing in a free state, and thus more accurate results can, in most cases, be obtained than by depending on a calculation from the percentage of potash used. Before acidifying the product of the saponification with sulphuric acid, it is necessary to boil off all traces of alcohol to ensure that no ethyl acetate is formed.

Oily bodies, such as free linalool, etc., can be more rapidly filtered off before distilling the acetic acid, in order to prevent bumping and also chances of recombination.—Chem. & Drugg., Jan. 8, 1898, 51.

Volatile Oils—A Simple Method of Testing.—Duyk recommends Maumené's reaction for the examination of volatile oils because of its simplicity and ready application, as follows: Into a prescription vial of 15 Cc. capacity place 4 Cc. of liquid paraffin, and 2 Cc. of the oil to be tested, mix them by rotating, and let 2 Cc. of concentrated sulphuric acid run along the walls into the bottom of the vial. Close with a perforated cork holding a thermometer, which dips into the liquid. Note the temperature, then shake to mix the acid with the oils, and note the highest temperature reached during the ensuing reaction. Subtract the lower from the higher temperature, which gives the increase due to the reaction: The author obtained the following results:

	Degrees C.
Cymene	4
Pinene	36
Limonene	26
Carvene	26
Thymene	24
Cedrene	15
Anethol	22
Thymol	7
Safrol	33
Carvacrol	4.5
Apiol	32
Eugenol	27
Geraniol	31.5
Menthol	9
Linalool	38
Eucalpytol	22
Terpineol	26
Santalol	33
Citral	40
Anisaldehyde	14
Benzaldehyde	9
Menthone	11
Citronellone	33
Carvol	30
Sandalwood oil (West Indian, self prepared)	38
Sandalwood oil (West Indian, purchased)	22.5 to 33
Sandalwood (East Indian)	12 to 18
Ol. Cedri	16 to 18
Bals. Copaibæ	24
Gurjun balsam	21
Ol. Menthæ (Mitcham)	16
Ol. Menthæ (Saxon)	13
Ol. Menthæ (Jap.)	20
Ol. Menthæ Crispæ	26

	Degrees C.
Ol. Lavandulæ (French)	34 to 37
Ol. Lavandulæ (Engl.)	33
Ol. Rosæ (Turk.)	34.5
Ol. Geranii	24
Ol. Citri	25 to 26
Ol. Aurantii (Portug.)	37
Ol. Aurantii flor.	36.5
Ol. Petigrains	33.5
Ol. Thymi Rubr	23.5
Ol. Thymi. Rect	22.5
Ol. Eucalypti	24
Ol. Caryophylli	28
Ol. Amyg. Amar	9.5
Ol. Cinnam. Ceylon	20
Ol. Cinnam. Cass	14
Ol. Carvi (French)	28
Ol. Carvi (German)	30
Ol. Cumini	17
Ol. Anisi	17
Ol. Anisi Stellati	21
Ol. Foeniculi	19.5

It is advisable to put sample and reagents into a room to equalize the temperature before admixture. The addition of liquid paraffin is for the purpose of preventing a too violent reaction, which with some oils might cause combustion.—Pharm. Era, March 3, 1898, 324; from Bull. de Pharm. de Bruxelles.

Australian Volatile Oils—Value as Perfumes and for Other Economic Purposes.— In the "Colonies and India" (Feb. 26, 1898, 13), attention is called to the large variety of plants in the Australian colonies, yielding delicious perfumes, and that little or nothing has so far been done to utilize them. Systematic flower farming is still in the experimental stages, and there exists an almost untouched field of great extent for those possessing the necessary capital and experience in the manufacture of perfumery and essential oils. In New South Wales the garden flowers of Europe and Asia, especially those emitting the richest fragrance, are found growing in unsurpassed luxuriance, many being obtainable nearly all the year round, whilst they are easily reared. Among the native perfume-yielding plants which remain unutilized are several varieties of acacia, including a few which furnish scented wood. The *acacia farnesiana* grows plentifully in many parts of New South Wales; and another species of acacia, familiarly known as the "Golden Wattle," is equally useful as a perfume plant, as is also the native laurel, or mock orange. Among the plants from which sweet-scented and other oils may be obtained are the native sassafras, peppermint, bloodwood, blue-gum, mountain ash, white gum, iron-bark, woolly butt, spotted gum, tallow-wood, messmate, red gum, poplar, box, ridge myrtle, tea-tree, native peppermint, dogwood, and turmeric. With regard to the economics of the Australian oils, it is found that the essential oil of the red gum is a reliable remedy for chronic dysentery and diarrhœa, that of the Moreton Bay ash makes an excellent furniture polish, and the oil obtained from the native sassafras, which resembles in odor the ordinary sassafras oil, with an admixture of caraway oil, is used for medicinal purposes. Eucalyptus oil, of course, possesses many valuable qualities, and the leaves of the various kinds of eucalyptus are found useful in preventing or removing scale in boilers. The oil of the "mountain ash," a common species of eucalyptus, is said to dissolve gutta-percha readily, and to be capable of use, like kerosene, for lamps, having a greater illuminating power, a pleasant odor, and absence of liability to explosion. The oil obtained from the "stringy bark" has been found to be more efficacious in many complaints than the English peppermint, and the oil of the "white gum" has been suggested as a soap perfume. The "woolly butt" oil indelibly stains paper, the oil of the "grey gum" possesses a citronella odor, and makes an excellent soap perfume; whilst several varieties of the "tea tree" furnish an oil said to possess most, if not all, of the properties of cajuput. Pratically, the number of native shrubs and trees in New South Wales capable of being utilized in the manufacture of perfumes and essential oils is without limit.—Pharm. Journ., April 2, 1898, 325.

Essential Oils for Perfumes—Characters, Components and Source.—The "Pharmaceutical Journal" (Feb. 26, 1898, 197–199), under the caption "Perfumery for Pharmacists," makes some practical remarks on the subject of perfumes with the special object of encouraging pharmacists to engage in their manufacture. Attention is also directed to the principal oils and their constituents, to the more important synthetic perfumes that are used, and to some of the more recently introduced natural perfumes, the whole constituting a compilation which may properly be introduced here for convenient reference.

I. PRINCIPAL OILS USED IN PEFUMERY.

Bergamot.—The chief constituents are linalool and acetate of linalyl.

Bay (Pimenta acris).—Citral, methyl-chavicol, chavicol, methyl-eugenol, eugenol.

Cassia.—Cinnamic aldehyde and acetate of cinnamyl.

Cinnamon.—Bark: Cinnamic aldehyde and eugenol. Leaves: In addition, saffrol, a larger proportion of eugenol, and benzoic acid. Root: In addition, camphor.

Citronella.—Citronellal, geraniol, and methyl-heptenone.

Clove.—Eugenol, furfurol, amyl, methyl-ketone.

Geranium Oil; Indian or Turkish: Geraniol, geranyl acetate and capronate, methyl-heptenone. *Rose Geranium Oil:* Geraniol, geranyl tiglinate, and citronellal.

Lavender.—Linalool, linalyl acetate, geranyl acetate, and cineol.

Linaloe.—Linalool, geraniol, methyl-heptenone.

Lemon.—Citral, citronellal.

Neroli.—Linalool, linalyl acetate, geranyl acetate.

Rose.—Geraniol, citronellal.

Rosemary.—Cineol, camphor, borneol.

Sandalwood.—Santalol and santalal.

Verbena.—Geraniol, citral, methyl-heptenone.

Ylang-ylang.—Linalool, geraniol, and their acetic and benzoic esters, para-kresol-methyl-ether.

It will be seen from the above list that many of these oils contain the same constituents, but, of course, in different proportions, and this suggests the idea that many other combinations might be formed artificially. It may be noted here that the odor of Russia leather in perfumes is given by the empyreumatic oil of *betula alba*, but a purer odor could probably be obtained by heating betulin, the crystalline principle contained in it.

2. SYNTHETIC PERFUMES.

Anisic Aldehyde.—Known commercially as "Aubepine." It possesses the odor of hawthorn flowers, but requires mixing with other odors to render it agreeable.

Benzyl Cinnamate, has the odor of balsam of Peru.

Bornyl Acetate, has the odor of fir trees.

Carvacrol, has a thyme-like odor.

Cinnamyl Alcohol, has an odor of hyacinths.

Citral or Geranic Aldehyde has the odor of lemon, and is more readily soluble in alcohol than essence of lemon.

Cumarin has the odor of new-mown hay.

Eugenol has the odor of cloves.

Geraniol.—Also called rhodinol and limonol. It has the odor of rose. Geranyl acetate has a lavender odor; geranyl formate is also made.

Ionone.—A ketone obtained from citral. It has a very powerful odor of violets.

Linalool and Linalyl Acetate have an odor between that of bergamot and French lavender. The latter is the "Bergamiol" of commerce (Schimmel). Linalyl formate resembles the odors of petitgrain and bergamot.

Methyl Benzoate.—The "Oil of Niobe" of commerce.

Methyl Salicylate.—Artificial oil of wintergreen.

Saffrol has the odor of sassafras.

Salicylal or Salicylic Aldehyde has the odor of meadow-sweet.

Terpineol has the odor of lilac.

Vanillin has the odor of vanilla.

There are also to be met with in commerce the synthetic oils of jasmin and neroli (Schimmel), and artificial musk (Baur).

3. RECENTLY INTRODUCED NATURAL PERFUMES.

Canada Snake Root Oil.—Asarum canadense.

Champaca Oil (Schimmel).—*Michelia champaca* and *M. longifolia.* Has an aromatic odor.

Champaca Oil (Haensel).—Guaiacum wood oil (Schimmel), derived, according to Haensel, from *Bulnesia sarmienti*, Lorenz. Used with otto of rose to give the odor of the tea rose, etc.

Costus Oil.—Aplotaxis auriculata. It has a violet odor.

Frejar Oil (Haensel).—Botanical source unknown.

Kuromoji Oil.—Lindera serica. Has a pleasant, spicy odor.

Ladanum Oil.—Cistus creticus, very persistent odor, somewhat like ambergris.

Nagkesar Oil (Haensel).—*Mesua ferrea.* Odor of a violet character.

Nigella Oil—Nigella damascena. It has an odor like raspberries.

Opoponax Oil.—Balsamodendron kafal. Obtained from the gum resin (Bissa-bol). Odor somewhat aromatic.

Peru Balsam has the odor of the balsam, but less empyreumatic.

Sandalwood Oil, African, has an odor resembling sandalwood.

Spicewood Oil.—Laurus Benzoin. Odor somewhat spicy.

Storax Oil has the odor of liquid storax.

Tolu Balsam Oil has a hyacinth odor.

Numerous oils available for culinary essences are also now procurable in commerce, *e. g.*, angelica, basil, celery, cherry-laurel, marjoram, parsley, parsnip, sage, summer savory, tarragon, thyme.

Violet Perfume—Synthetic Production from Oil of Lemon.—According to "Zeitschr. f. Angew. Chem.," a new synthetic violet perfume is obtained from oil of lemon in the following manner by a patented process: Oil of lemon and acetone in alcoholic solution are boiled for 16 or 18 hours in presence of pure calcium chloride and a small quantity of an aqueous solution of cobalt nitrate. The excess of acetone and alcohol is then distilled off, the residue heated with an acid solution of sodium sulphate for a week and finally subjected to a fractional distillation. Products of disagreeable odor first distill over, and subsequently, at 142° to 150° C., under 12 Mm. pressure, the violet essence.—Pharm. Era, April 28, 1898, 618.

Fluid Rose Paraffin—A Product Similar to Flower-Pomades.—"Schimmel & Co." (Report, Oct., 1897, 51), have succeeded in preparing with absolutely pure liquid paraffin, by the same process of maceration as is employed for preparing flower-pomade, a product which they bring into the market under the name of "fluid rose paraffin." It at least equals in strength and in richness the best rose pomade, and offers other advantages, such as unlimited permanence, freedom from rancidity, ease of abstraction of odor by alcohol, economy in alcohol, and utilization—as hair oil—of the residual paraffin oil.

Oleum Terebinthinæ Rectificatus—Modification of the Germ. Pharm. Directions.—It is stated in "Pharm. Ztg." (xlii, 430) that a good commercial oil of turpentine distilled with lime water furnishes about 90 to 92 per cent. of a neutral, resin free distillate, while the German Pharmacopœia directs that only 75 per cent. of the oil be collected. Experiments have been made to determine the value of the 15 or 17 per cent. of oil that is thus rejected and lost, several samples of crude oil of various sources being distilled and collected in fractions, the first of 50 per cent., the second of 25 per cent., and a third of 15 to 17 per cent. It was found that the specific gravities and boiling points rise slightly with the fractions. It is recommended that instead of directing the collection of three-fourths, about nine-tenths of the oil should be recovered during the rectification process; the boiling point should be stated to be between 150° and 190°, and the limits of the specific gravities increased a few degrees.—Pharm. Journ., July 31, 1897, 85.

French Oil of Turpentine—Detection of Resin Oil in Admixture.—Aignau points out that French oil of turpentine being lævo-rotatory, while resin oil, which is often added as an adulterant, is dextro-rotatory, any considerable admixture of the one with the other can be readily detected by simply observing the optical rotation. By distilling off the greater part of the sample the presence of a very small amount of the adulterant can be detected. Thus, taking 250 Cc. of turpentine oil containing 3 per cent. of added resin oil and distilling it until the residue amounted to 70 Cc., the rotation of this was found to be only —36.21 in a 200 Mm. tube. The rotation of the same amount of residue from the unmixed oil was —51.5. If the distillation be conducted under reduced pressure, as small a quantity as 0.5 per cent. of resin oil will give a dextro-rotatory residue, while that for pure French turpentine oil will remain strongly lævo-rotatory.—Pharm. Journ., Sept. 18, 1897, 260; from Comptes rendus, cxxiv., 1367.

Iodterpin—A Substitute for Tinct. of Iodine, etc.—A. Lieven has introduced a new substitute for iodoform as well as for tincture of iodine, which he designates by the name "iodterpin" and claims for it the formula $C_{10}H_{16}I$. It is a dark brown fluid produced by the direct combination of terpin and iodine, has an odor resembling oil of turpentine, a sp. gr. of 1.19 at 15° C. and boils between 165° and 175° C. It is readily soluble in ether, benzene, petroleum benzin and chloroform, while neutral absolute alcohol dissolves it to the extent of 10 per cent. It is miscible in all proportions with fats and vaselin, is easily absorbed by the skin without destroying it, and, containing 50 per cent. of its weight of iodine, possesses advantages over iodoform in surgery as well as over tincture of iodine as a therapeutic agent.—Pharm. Post, Sept. 5, 1897, 433.

Larch-Needle Oil—Characters and Constituents.—Schimmel & Co. (Report, Oct. 1897, 61) state that the needles of the European larch, *Larix europæa*, D. C., yield on distillation 0.22 per cent. of an oil, having the sp. gr. 0.878, a slight dextro-rotation (+0°22′ at 18°), a saponification factor of 23.3, which, after acetylization, is increased to 46. It is soluble in 5 parts or more of 90 per cent. alcohol. Assuming that the ester of larch needle oil is bornyl acetate, as is the case with most oils of conifers, the above figures would indicate 8.1 per cent. of bornyl acetate before and 16.1 per cent. after acetylization. The oil has a refreshing, pleasant larch-needle fragrance. The greater part—91 per cent.—distils between 160° and 230°.

Cedar Oil—Chemical Composition.—Rousset describes the two principal constituents of cedar oil, the hydrocarbon, *cedrene*, and the alcohol *cedrol*, or cedar camphor. When rectified by distillation over sodium, cedrene boils at 131° to 132°, its opt. rot. $(a)_{15} = -47^\circ 54'$. It is a sesquiterpene, which on oxidation under proper conditions yields a liquid ketone, $C_{15}H_{24}O$, boiling at 147° to 151°, which is called *cedrone.* This yields with hydroxylamine an oxime, which in its turn yields on treatment with acetic anhydride an acetate of the composition $C_{17}H_{27}O_2N$. If the liquid ketone is reduced by an ethereal solution of sodium, a liquid alcohol isomeric with cedrol, and therefore *isocedrol*, $C_{15}H_{26}O$, is formed.

Cedrol, or cedar camphor, yields with acetic anhydride an acetic acid ester, together with a sesquiterpene, but when acted on by benzoyl chloride, no ester, but the hydrocarbon $C_{15}H_{24}$ is formed (probably identical with cedrene (?)). It yields neither a ketone nor an aldehyde upon oxidation, and seems, therefore, to be a tertiary alcohol.—Schimmel's Rep., Oct., 1897, 13; from Bull. Soc. Chim., 1897, 485.

Cedar Leaf Oil—Commercial Variation Due to Different Sources.—Schimmel & Co. (Report, April, 1898, 14), call attention to the confusion that prevails in American markets in consequence of the fact that several different conifers pass under the common name "cedar," the principal ones being *juniperus virginiana*—red cedar—and *thuja occidentalis* and *chamaecyparis sphæroidea*, both white cedars. Manufacturers of cedar oil seem to ignore, or not to be aware of the distinctions, and to prepare cedar leaf oil from needles of any one or several of the species indiscriminately. The consequent variation in the oil is exemplified by the differences observed in the respective specific gravities, official character, and solubility in six specimens, all of which had more or less the strong odor of thuja.

An Oil from the Needles of Juniperus Virginiana, distilled in 1894, was recently subjected to examination. It differs from all the commercial oils. Its sp. gr. is 0.887, its opt. rot. − 59° 25′, it is insoluble in 16 parts of 16 per cent. alcohol, and its odor is pleasant, somewhat sweet. On fractionation most of the oil passed over at 180°, and of this the greater part passed between 173° and 176°, and proved to be almost pure dextro-limonene. Constituents with a lower boiling-point, present in minute quantities, suggest pinene, but the exact nature remains to be determined. Among the higher boiling constituents, cadinene, some borneol, and small portions of bornyl esters were determined. True oil of cedar leaves seems not to come into commerce, the common oil passing under this name being an indefinite distillate of miscellaneous conifer needles, including those of thuja.

Bergamot Oil—Valuation.—Commenting upon some questions recently raised by the Chamber of Commerce of Reggio, concerning the constituents of bergamot upon which its perfume value depends, Schimmel & Co. (Report, April, 1898, 22) observe that there can be no doubt, as is amply confirmed by practice and experience, that linalyl acetate is the most valuable constituent, indicative of the worth of the oil which at the same time admits of a ready estimation by means of saponification. Of course the percentage of linalyl acetate is decreased proportionately upon an admixture of substances foreign to bergamot oil. The amount of this ester, therefore, permits a fair estimate of both the ester and the adulterant contained in the oil. Additional factors in the valuation of bergamot oil are its physical constants—specific gravity, solubility, optical rotation, and the residue upon evaporation.

Mandarin Oil—Characters and Composition.—The characters of the volatile oil obtained by processes from *citrus madurensis*, Loureiro, as given by De Luca in 1857, led Gildemeister and Stephan to conjecture that the terpene ($C_{10}H_{16}$), found by De Luca, was dextro-limonene, a view which was confirmed by their present investigation. The oil had a sp. gr. of 0.855 at 15°, its rotatory power being $(a)_D = +69.54°$ at 16°. It began to boil at 175° and distilled at 179°, leaving a small residue. The fraction between 175° and 177° ($[a]_D = +76.45°$), gave limonene tetrabromide (m. p. 104° to 105°). A portion of the same fraction, when treated with hydrochloric acid gas, gave De Luca's product, namely, dipentenedihydrochloride. From these results it is concluded that dextro-limonene is the chief constituent of mandarin oil. Evidence was also obtained which pointed to the presence of citral and citronellal in the undistilled residue, but a larger quantity of the oil must be worked up to determine the point satisfactorily.—Arch. d. Pharm., 1897 (*235*), 582.

Rosemary Oil—Requirements regarding Quality.—On the basis of a series of experiments undertaken by the chemists of Schimmel & Co., with oils of rosemary of their own distillation, as well as with a number of reliable commercial oils, they have established the following requirements for rosemary oil of proper quality:

1. The specific gravity should not fall below 0.900.
2. The oil should be dextro-rotatory.
3. 1 part of oil should form a clear solution with ½ part or more by volume of 90 per cent. alcohol, and also with 10 parts of 80 per cent. alcohol.

4. The first fraction of 10 per cent. obtained by distillation must be dextro-rotatory.—Schimmel's Report, Oct., 1897, 53.

Rosemary Oil—Pinene a Normal Constituent.—In view of the fact that oil of turpentine is the chief adulterant of oil of rosemary, Gildemeister and Stephan have experimented to ascertain definitely whether pinene is a natural constituent of rosemary oil, as its presence might be otherwise ascribed to sophistication. For this purpose a genuine oil was obtained by distillation from the leaves, and the results of the investigation proved that pinene—probably a mixture of dextro- and lævo-pinene—is a normal constituent, so the presence of this terpene, unless in considerable quantity, is no evidence of adulteration with turpentine oil. A pure oil should have a specific gravity above .900 at 15°; the oil itself, as well as the first 10 per cent. of its distillate, should be dextro-rotatory, and one part of the oil should give a clear solution with 0.5 part of 90 per cent. and with 10 parts of 80 per cent. alcohol.—Arch. de Pharm., 1897, *235*, 582.

Oil of Spike Lavender—Adulteration with Rosemary Oil.—John C. Umney calls attention to certain variations observed in the so-called spike lavender oil at present occurring in the market. While the sp. gr. (0.905 to 0.915 at 15° C.) and the optical rotation (+ 0 to + 7) are practically normal, there is a marked difference in the behavior towards alcohol of 70 per cent. (volume), for whilst pure spike oil dissolves readily at 15° C. in 2½ to 3 volumes of such alcohol, these sophisticated oils do not dissolve completely in less than 5 volumes. The percentage of alcohols in these oils, as determined by the acetylization process, varies between 20 and 25 per cent., whilst in pure spike oils it varies between 30 and 40 per cent. These variations from normal spike-lavender oils point strongly to the presence of a rosemary oil of a low grade, possibly the Dalmatian variety. Dalmatian rosemary oil has practically the same specific gravity and optical rotation as spike-lavender oil, but it is not soluble even in 10 parts of 70 per cent. alcohol, and the percentage of alcohols has not exceeded, so far as he has observed, 16 per cent. The odor of this oil when acetylized is very different from that of acetylized spike-lavender oil, owing to the formation of linalyl and geranyl acetate, in the latter, the alcohols yielding these esters being absent from rosemary oil. The author insists that oil of spike-lavender shall have the following characteristics:

Specific gravity at 15° C., .905 to .915 Optical rotation in a tube of 100 Mm., from +0 to +7.	To insure freedom from turpentine.
Soluble in 3 volumes of alcohol 70 per cent. by volume .... Not less than 30 per cent. of alcohols	To ensure freedom from rosemary oils.

The yield of the oil in Grasse, Nîmes, and in Southern France generally, in the autumn of last year was much below the average, and, in consequence, much higher prices have ruled, and at least 50 per cent. more is now being paid as compared with rates ruling after a normal season.—Chem. & Drugg., Jan. 29, 1898, 166.

Oil of Tanacetum balsamita, L.—Yield, Characters, etc.—Schimmel & Co. (Report, Oct., 1897, 60) obtained by distilling the cultivated green and flowering plants of the balsam tansy 0.064 per cent. of oil, of balsamic agreeable odor, but recalling that of the oil of common tansy. Its sp. gr. is 0.943, its opt. rot., —53° 48′, and its saponification number 21. On standing in a cool place it separates, on the surface, paraffin-like crystals. It is not soluble in 80 per cent. alcohol, but forms a clear solution with 1 to 2 parts of 90 per cent. alcohol, which becomes turbid again on further dilution with separation of floccules—probably the paraffin-like body. The oil distils completely between 207° and 283°.

Oil of Spearmint—Differences Observed Between the German and American and the Russian Oil.—Schimmel & Co. (Report, April 1898, 46), observes that Russian oil of spearmint, which recently occurs in large quantities in the market, shows a striking difference from German and American oils by a stale odor, a lower specific gravity (0.88) and less optical rotation (—23°); while both other kinds have a sp. gr. between 0.92 and 0.98 and an opt. rot. as high as —43°. In German and American oils, also, the presence of l-carvon to the amount of 35 to 56 per cent. has been determined by A. Bayer. Russian oil was therefore submitted to examination. It was found to have the sp. gr. of 0.885 at 15° and the opt. rot.—25° 12′ at 17°; it formed a clear solution with 2 volumes of 70 per cent. alcohol, and gave the saponification figure of 25.9. Experiments given in some detail show the proportions of the principal constituents of Russian oil of spearmint to be probably as follows: Laevo-carvone, 5 to 10 per cent.; laevo-linalool, 50 to 60 per cent.; cineol and laevo-limonene, 20 per cent. The difference between the two kinds of the oils is caused mainly by the relatively high percentage of linalool and deficiency in carvone of the Russian product.

Oil of Peppermint—Commercial Quality.—Carl G. Hunkel observes, that oil of peppermint is a variable substance, as supplied in the market, which must become evident when we consider that it is naturally a mixture of sixteen or more distinct chemical substances, which must vary in their proportions according to locality, soil, irrigation, and other conditions of growth, as well as the method and care taken in its distillation. After reviewing the chemical components, their method of separation and of determining adulterants, the author communicates the results of his examination of seven commercial samples of peppermint oil procured in Wisconsin, which are briefly as follows:

No.	Commercial Brand.	Sp. Gr. at 15° C.	Menthol, as ester.	Menthol, free.
1	Mayne Co., select	0.9110	10.9 per cent.	49.7 per cent.
2	Todd, crystal-white	0.9098	6.8 "	56.5 "
3	Dementholized	0.9314	7.9 "	33. "
4	Michigan oil.....	0.9230	7.6 "	57.5 "
5	Mayne Co., select	0.9130	9.8 "	56. "
6	Todd, select	0.9135	7.65 "	57.3 "
7	Mayne Co.................	0.9134	7.9 "	55.6 "

—Proc. Wis. Pharm. Assoc., 1897, 58–60.

Menthol—Estimation in Oil of Peppermint.—Referring to S. F. Kebler's modification of the method of Dr. F. Power and Dr. Clemens Kleber for estimating menthol in oil of peppermint (see Proceedings 1897, 643), the latter (Dr. Kleber) observes that the modified method is less practical than the original method. Furthermore, a quick approximate estimation of menthol in peppermint oil can be made in the following way: About 5 grammes of peppermint oil, accurately weighed, are mixed in a flask connected with a ground glass condenser tube, with about 5 Cc. acetic anhydride, accurately measured, and boiled for 30 minutes. In the meantime, an equal quantity of the same acetic anhydride is titrated with normal caustic soda and phenolphtalein. After cooling the boiled liquid somewhat, the condenser is taken off and washed with some water, which is added to the acetylized mixture, and then the latter is titrated with normal caustic soda. The difference in the number of Cc. in both titrations multiplied by 0.156 gives the menthol in the oil used. All of the operations can easily be performed in 50 minutes. — Pharm. Rev., July, 1897, 135.

Menthol Carbonate—Rapid and Convenient Method of Preparation.—In 1886, G. Arth described menthol carbonate as a by-product in the preparation of menthyl urethane, obtained by the action of cyanogen gas or of cyanogen on sodium-menthol. Menthol carbonate, having been preferred by some writers as a substitute for menthol on account of its freedom from caustic action on the mucous membrane, Erdmann now proposes the following method for its preparation, which is convenient, rapid and economical. To a solution of menthol, 30 Gm., chloroform, 30 Cc., and anhydrous pyridine, 25 Cc., add, by small portions, a chloroformic solution of phosgene containing 10 Gm. of $COCl_2$, stirring the whole time. This is then left to stand for twenty-four hours, then, without separating the two layers of liquid, it is treated with steam. Traces of uncombined menthol pass off at the same time as the pyridine. The residue consists of crystalline menthol carbonate, which is washed with warm water and recrystallized in a large quantity of warm alcohol. The carbonate, hardly soluble in alcohol in the cold, is deposited in long white prisms melting at

105° precisely. The reaction is almost quantitative.—Chem. News, May 27, 1898, 242; from Journ. für Prakt. Chemie, lvi., p. 43.

Validol—A Compound of Menthol and Valerianic Acid.—A German manufacturing firm has introduced under the name of validol a chemical compound of menthol and valerianic acid, containing 30 per cent. of free menthol. It is a clear, colorless, and thick liquid, with a mild and pleasant odor, and, like menthol, produces a cool feeling upon the skin. It is recommended by Dr. Schwersenski (*Therap. Monatsh.*) as a local application like menthol, but it may also be used as a carminative and stomachic in doses of 10 to 15 drops taken upon sugar. It has a very revivifying effect when taken internally.—Chem. & Drugg., Jan. 15, 1898, 91.

Bitter Fennel Oil—Components—According to Tardy, French cultivated bitter fennel oil contains phellandrine, cymene, fenchone, estragol, anethol, anisic aldehyde, anisic ketone, anisic acid, and a crystalline body having the composition corresponding to the formula $C_{13}H_{14}O_2$.—Pharm. Journ., Aug. 28, 1897, 190; from Journ. de Pharm. (6), vi, 98.

Anethol—Researches on its Isomers.—From a summary of the researches of Orndorff, Terasse, and Morton on the isomers of anethol, it appears that the *methylchavicol* of Eykman and the *estragol* of Griman have the same molecular weight and are metameric forms of anethol. From the results obtained by various investigators it must be concluded that they are identical. *Fluid metanethol* has the same molecular weight as anethol, and is a metamer of this substance. From its chemical behavior and its physical properties it must be a stereoisomer of anethol, and it is probably *anisoin*, a resinous polymeric modification of anethol, which acts as a colloid towards the solvents, acetic ether, acetone, benzene, etc. *Solid metanethol* and the *fluid isoanethol* have both the same molecular weight and are polymers of anethol. As their molecular weight is twice that of anethol it is proposed to call them *solid* and *liquid dianethol* respectively; as both act like saturated compounds, they may possibly be derivatives of tetramethylene. Anethol, heated under pressure to 250–275° C., is converted into isoanethol, the methyl ester of paracresol, and the methyl ester of parapropylphenol. Under these conditions there is apparently a tendency to form saturated compounds.—Amer. Chem. Journ., xix, 845.

Thymol Iodide—Preparation.—The "Cincinnati Academy of Pharmacy," published the following formula for thymol iodide: Thymol, 50 Gm.; potassium iodide, 58 Gm.; sodium hydrate, 50 Gm.; solution of chlorinated soda, water, of each a sufficient quantity. Dissolve the solids in sufficient water to make 500 Cc. Collect precipitate on filter and wash with water until free from chlorides. Remove precipitate and dry carefully at a temperature not exceeding 20° C. Reduce to powder and keep in a well-stoppered dark bottle. The resulting product has the formula

$C_{20}H_{24}O_{21}I_2$, and contains 45 per cent. of iodine.—Amer. Drugg., March 10, 1898, 130.

Iodol—Value in the Treatment of Syphilis.—According to Mozocchi, a plaster of iodol gives excellent results in the treatment of various syphilitic diseases, it being, unlike resorcin and mercurial plaster when employed for this purpose, non-irritating in its action.—Pharm. Post., xxx., 293.

Iodocrol—A New Substitute for Iodoform.—Cohn has applied the name "iodocrol" to *carvacrol iodide*, which is introduced as a substitute for iodoform, over which it possesses the advantage of being odorless, and more powerfully antiseptic—it having five times the strength in bactericidal power. It is soluble in ether or in chloroform.—Pharm. Ztg., 1897, 828.

Celery Oil—Acid Constituents.—Ciamician and Silber have isolated two acids from the higher boiling fraction of celery oil, the one sedanolic acid, the other sedanonic acid. The oil was saponified with 25 per cent. potash solution under a reflux condenser in an oil bath. From the aqueous solution of the potash salts so obtained, the two acids are liberated together as an oily fluid, and on shaking this with warm sodium carbonate solution,

Sedanonic Acid enters into solution, leaving the sedanolic acid in the form of its anhydride, sedanolide, undissolved. The sedanonic acid, $C_{12}H_{18}O_3$, when liberated from the sodium salt so obtained, forms white crystals melting at 113° C., and appears to be an acid acetone.

Sedanolide, $C_{12}H_{18}O_2$, is a liquid boiling at 183° to 185° C. at 17 Mm. When pure it is colorless, and has the strong odor of celery, and is doubtless the odorous principle of the plant, in which it exists in a free state.

Sedanolic Acid obtained from it crystallizes in white needles, melting at 90° to 91° C., and is insoluble in water, but soluble in ether and in benzin. —Pharm. Journ., Aug. 28, 1897, 190; from Berichte.

Celery Oil—Superiority of the Oil from the Green Herb.—Schimmel & Co. (Report, Oct., 1897, 15) state that the oil distilled from the green celery herb is of excellent aroma, with which that of the oil prepared from the fruit cannot be compared. When this oil is used in place of the fresh herb, it should be borne in mind that 1 part by weight of the oil represents just 1000 parts of the fresh herb. Concerning the chemical constitution of celery oil, a recent paper by G. Ciamician and P. Silber (Berichte, *30*, pp. 492, 501, 1419, 1424, 1427) is quoted, from which it appears that among the phenols contained in the oil, guaiacol and a crystalline substance melting at 66° to 67°, and having the composition $C_{16}H_{20}O_3$, were found, while alkali extracts from the oil gave two acid constituents—*sedanolic acid*, $C_{12}H_{20}O_3$, and *sedanonic acid*, $C_{12}H_{18}O_3$, two closely related compounds. In the residue after treatment with alkali, a terpene-like body, mostly boiling at 262° to 269°, and corresponding to the formula $C_{15}H_{24}$, was obtained.

Basilicum Oil—Distinction of the Oils Distilled from European Plants and Plants Cultivated on Réunion.—According to continued experiments by Dupont and Guerlain with basilicum oil, it appears that while the oils obtained from plants cultivated in Europe—undoubtedly *ocymum basilicum*, L.—have the same composition, the very considerable difference in the composition of oils obtained in Europe and on Réunion seems to be due to the fact that the plants cultivated on this island are another species or a variety of the same plant. Basilicum oil from Réunion differs from the German and French distilled oils, by its strong camphor-like odor, and yb its dextro-rotatory power, amounting to +120°, while the opt. rot. of the European oil is —7° 40′. It also contains chavicol, but no linalool. These results agree with those of Bertram and Walbaum, who found that Réunion basilicum oil consists of about 60 per cent. of methyl chavicol, containing besides small amounts of d-pinene, d-camphor, and cineol.—Schimmel's Rep., April, 1898, 9; from Bull. Soc. Chim. (3), *19*, 151.

Savory Oils—Characters.—Schimmel & Co. (Report, Oct., 1897, 59), have distilled the essential oils from the fresh blooming plant of summer savory (*satureja hortensis*, L), and also from the mountain savory (*satureja montana*, L.). The percentage of

Oil of Summer Savory was only 0.097. It had the sp. gr. 0.904, opt. rot. +0° 4′, required 9 parts of 80 per cent. alcohol for solution, and formed a turbid solution with 70 per cent. alcohol. Its odor was pleasantly aromatic, and it contained 38 per cent. of phenol-carvacrol.

Oil of Mountain Savory was obtained in double the amount, the yield being 0.18 per cent. Its sp. gr. is 0.939, its opt. rot. —2° 35′, and it contains 65 per cent. of phenol. It forms a clear solution with 4.5 or more parts of 70 per cent. alcohol, and with 1½ parts of 80 per cent. alcohol. Its odor is identical with that of common savory oil, and its composition nearly so.

Lemongrass Oil—Value Dependent Upon the Percentage of Citral.—John C. Umney observes that the employment of citral for the production of ionone, has led to a very considerable advance in the price of lemongrass oil, and although the percentage of citral contained in it was not of great importance when the oil was at about one-eighth of its present price, it now becomes almost imperative that the valuation of the oil should be based upon the percentage of this constituent. The samples of lemongrass oil examined by the author during the past few years contained percentages of citral varying from 44 to 75 per cent., and even six samples sent to him recently as representing a shipment of thirty cases, have been found to vary from 44 to 69. The difference between these samples is obviously very important, and a valuation of the oil according to the percentage of its most important odorous constituent would place it on the same footing as oils of bergamot, French lavender, caraway, cassia, etc.—Chem. & Drugg., Dec. 18, 1897, 961.

Oil of Citronella—Inquiry Into Cause of Commercial Variations.—John C. Umney and R. S. Swinton point out some marked differences between native-distilled oils of citronella and the oils distilled, so far as is known, from practically the same grasses, by two English firms, the one located at Singapore, the other at Galle, Ceylon. They find, in distinction from the established character of the native distilled oils, that the oils distilled by the English firms have a sp. gr. of 0.886 to 0.889, an optical rotation in a tube of 100 Mm. of —4 to —6, and that they are completely soluble in 80 per cent. alcohol. The two classes of oils being practically distilled from the same material, the authors conceived the idea that there might be a difference in the method of distillation the native-distilled oils—designated as class *A*—being known to be distilled by direct heat, while nothing could be learned as to the method pursued for distilling the oils of the English firm—class *B*. By fractioning a considerable quantity of an oil of class *A* in a current of steam, a residue amounting to 37 per cent. finally remained, while the oils of class *B*, fractioned under precisely similar conditions, passed over practically completely, making it evident that these oils had been obtained by distillation with steam.

Extended examination made of the residue of the oil of class *A* points out that it is mainly composed of a body boiling under ordinary pressure between 245° and 280° C., and that, while possessing all the characters of a sesquiterpene, it does not agree with any of the hitherto described bodies of this class, such as cadinene, caryophyllene, clovene, etc. Its characters are therefore subject of further study, it being necessary to point out, however, in this connection that it is odorless, and consequently a valueless constituent of the oil. It is, moreover, not nearly as soluble in alcohol of 80 per cent. as geraniol and citronellic aldehyde, is quite devoid of optical rotation, and has a high specific gravity. These and other results obtained by the authors point to the following conclusions:

1. The native-distilled commercial citronella oils differ from those distilled by English firms in containing a highly optically active terpene, which raises the optical rotation, and a large percentage of sesquiterpene which raises the specific gravity, the presence of which constituents reduces the odor value and impairs the solubility in alcohol.

2. The oils of the two English firms respectively are possessed of approximately 30 per cent. greater odor value than most native-distilled commercial oils.—Trans. Brit. Pharm. Comp. (Yearbook of Pharmacy), 1897, 365–369.

Citronellal—Products of Reaction with Sulphuric Acid.—Barbier and Leser have isolated three distinct bodies from the products of reaction obtained by agitating pure citronellal for six hours with ten times its weight of

5 per cent. sulphuric acid. The aldehyde becomes viscous and develops a strong, minty odor. Subjected to fractional distillation, the portion boiling at 88° to 89° C. under a pressure of 10 Mm., was recognized to be *isopulegol.* A second body was obtained at the same pressure between 144° and 145° C., in the form of a colorless fluid, which on cooling solidified to a crystalline mass. When purified the crystals melted at 80° to 81° C., had the composition corresponding to the formula $C_{10}H_{20}O_2$, and are regarded to be a glycol which the authors have named

Mentho-glycol.—Treated with acetic anhyhride at 100° C., it yields an acetic ether $C_{10}H_{19}O(C_2H_3O_2)$; but when heated with acetic anhydride and sodium acetate, the body $C_{10}H_{17}(OC_2H_3O)$ was formed, and when hydrochloric acid gas was passed into a solution of this substance in glacial acetic acid, the compound $C_{10}H_{18}Cl(OC_2H_3O)$ was produced. By the abstraction of a molecule of water from mentho-glycol it is converted into isopulegol, and the latter in its turn will yield mentho-glycol by the introduction of a molecule of water.

The third substance obtained was a small quantity of a body having the composition $C_{20}H_{34}O$, which boils at 185° C., under 10 Mm. pressure, and is considered to be a condensation product of ten mols. of citronellal with the elimination of 1 mol. of water.—Pharm. Journ., July 31, 1897, 82; from Compt. rend., cxxiv., 1308.

Geraniol—A Small Constituent of Oil of Lavender.—While Messrs. Schimmel & Co. (Report, April, 1898, 31) have for some time had the conviction that geraniol is a constituent of oil of lavender, this opinion could not be sustained by decisive evidence, mainly because its quantity is a minute one. Upon examination of the fractions with a higher boiling-point of a large quantity of oil, they have, however, succeeded in furnishing an accurate and sure proof of this fact. From a small fraction separated from the larger by methods briefly explained, they succeeded in preparing the diphenyl carbamic acid ester, melting at 82° C. It could not be ascertained, however, whether geraniol is contained in oil of lavender in a free state or in the form of an ester, though the latter seems the more probable.

Rhodinol vs. Geraniol—Controversy Concerning the Application of the Names.—On the ground that Poleck together with Eckert discovered the alcohol $C_{10}H_{18}O$ in German and Turkish rose oil, the former claims the right to decide that the name rhodinol and not geraniol should be applied to this constituent of rose oil, notwithstanding that Bertram and Gildemeister have shown that the rhodinol of Poleck is identical with the alcohol of geranium oil, and called geraniol by Jacobsen several years previously.—Pharm. Journ., Feb. 26, 1898, 183; from Berichte, *31*, 29.

Oil of Rose—Confusion in Naming its Constituents.—Schimmel & Co. (Report, April, 1898, 40) observe that in spite of the fact that the long prevailing uncertainity in regard to the principal constituents of the fluid parts of oil of rose has finally been settled, and that those are recognized to be two alcohols—one $C_{10}H_{18}O$, constituting 75 per cent. of the oil, the other $C_{10}H_{20}O$—the so-called rose-oil problem still remains in dispute, inasmuch as a controversy in regard to the proper names of these alcohols is still going on. For the alcohol $C_{10}H_{18}O$ most chemists prefer the name *geraniol*, given by its original discoverer Jacobsen, while Barbier and Bouveault call it *lemonol*, and Erdmann and Huth, and Poleck, call it *rhodinol*. The second alcohol, $C_{10}H_{20}O$, having by Tieman and Schmidt been identified with Dodge's *citronellol*, is so called by them, but they also deem it pertinent to retain for the lævo- modification of this alcohol contained in the oil of rose the name *rhodinol*, chosen by Eckhart for the mixture of geraniol and citronellol which he at first believed to be a definite alcohol different from geraniol. Barbier and Bouveault also call the alcohol $C_{10}H_{20}O$ *rhodinol*, while Hesse and Naschold call it *réuniol* on account of its presence in Réunion oil of geranium.

Rose Oil—Prominent Constituents and Relation to Other Oils.—Within the last few years the investigation of oil of rose and some other kinds of essential oils related to it, has furnished many interesting results as to the chemical nature of their constituents, but some confusion has been caused by the application of various names to the products obtained, which apparently have not in all instances been completely separated from their admixtures. In a long memoir on the subject, Erdmann now points out that all who have studied rose oil have noticed that the alcohol, $C_{10}H_{17}OH$, is associated with another very similar alcohol, $C_{10}H_{19}OH$; but while agreeing that the odor of rose oil may be due to more than one substance, he contends that the alcohol, $C_{10}H_{17}OH$, is the most important, both in regard to its proportion and to the quality of its odor. He gives the results of his more recent experiments with these oils, and reviews the results obtained by other experiments up to the present time, and concludes that these make it very evident that an alcohol having the formula $C_{10}H_{17}OH$ is a common constituent of rose oil, of geranium oil, and of the various essential oils obtained from species of andropogon. When pure this alcohol has no rotatory power, but it is very difficult to separate it so completely from other constituents of the oils in which it occurs naturally, as to be quite inactive optically. That circumstance appears to account for the discrepant results obtained by different experiments, and to explain in great measure the conclusions arrived at by them. As to the name to be given to this alcohol, the argument in favor of its being called geraniol appears to be much more entitled to consideration than that adduced in favor of others; for if this alcoholic constituent of rose oil is really identical with that obtained by Jacobsen from andropogon oil, and named geraniol by him in 1871, the fact of its being also a constituent of rose oil—ascertained much later—does not warrant the adoption of a different chemical name.

Consequently the names rhodinol, roseol, reuniol, etc., can only be regarded as applicable in the sense of trade-marks to the products of particular manufacturers.—Pharm. Journ., Nov. 13, 1897, 419; from Journ. Prakt. Chem., 1897 (2), lvi., 44.

Angelica Oil—Difference Between the Oil of Fresh and Dried Roots.—H. Raeusel finds that the oil distilled from fresh angelica roots has a lower specific gravity (0.860 at 16° C), and is more dextro-rotatory (+36.5), than the volatile oil of dried roots, which shows a rotation of +26, and has a specific gravity at 21° C. of 0.882. When angelica oil is freed from terpene its specific gravity is increased to 0.9597, and its rotation reduced to +5.21.—Pharm. Wochenschr., 1898, 45.

Oil of Angostura Bark—Yield, Character and Composition.—H. Beckurts and J. Troeger communicate the results of a very comprehensive examination of volatile oil of the *Cusparia trifoliata*, Engler (*Galipea officinalis*, Engler). The oil under examination was distilled at their request by Schimmel & Co., Leipzig, the yield from 100 kg. of angustura bark being 1½ kg. It has an aromatic odor and taste, and a faint yellowish color when recently distilled, becoming darker on standing, and finally turbid and deep brown in color. Its sp. gr. at 20° C. is 0.941, and it is optically active, deflecting 50° to the left in a 100 Mm. tube. The results of their examination of its components, which are given in detail, lead the authors to the conclusion that angostura oil is a mixture of a sesquiterpene—*galipene*, $C_{15}H_{24}$—and of a sesquiterpene alcohol—*galipene alcohol*, $C_{15}H_{26}O$—the separation of which is attended with considerable difficulties. The most remarkable observation made is that while the oil itself rotates strongly to the left, the terpene deflects polarized light to the right, and the alcohol is inactive. It may, therefore, be inferred that during the isolation of the sesquiterpene from the crude oil it is inverted, and that in all probability the terpene contained in the crude oil possesses a different rotatory power from that obtained by the aid of acetic anhydride.—Arch. d. Ph., No. 7 (Oct. 15), 1897, 518–535.

Cardamom Oils—Different Kinds.—Schimmel & Co. (Report, October, 1897, 10–12), give a brief resumé of the results of their examination of the oils from different species of cardamom. The fruits of *elettaria cardamomum*, Matton, yield 2.14 per cent. of oil, designated as

Malabar Cardamom Oil. This is light yellow, and has an odor only little different from that of the commercial Ceylon cardamom oil, a much cheaper product, distilled from the fruits of a variety (β) of the same plant. Its sp. gr. is 0.943. optical rotation +34° 52′ at 19°; it is soluble in 4 or more parts of 70 per cent. alcohol, and has a saponification factor of 132, indicating a rather high amount of ester. The process of separating the constituents of the oil and their character are described. An important observation is that the oil contains a small percentage of optically very active terpineol. The angle of optical rotation was found to be +83° 31′ at 21°.

Siam Cardamom Oil, distilled from the so-called "camphor seeds"—the seeds of *amomum cardamomum*, L., was obtained to the amount of 2.4 per cent. It is semi-solid at ordinary temperatures, and has a distinct odor of camphor and borneol. Liquefied at 42°, it has the sp. gr. 0.905, and an optical rotation of + 38° 4′. Its saponification factor is 18.8, which on acetylization was raised to 77.2, corresponding to 22.5 per cent. of borneol in the original oil. The stearoptene, or crystalline part of the oil, on examination proved to be a mixture of dextro borneol and dextro-camphor, in approximately equal proportions.

Kameroon Cardamom Oil was obtained from fruits which are identical with those described as Madagascar cardamom, and are derived from *Amomum Danielli*, Hook. fil. (= *A. angustifolium*, Sonnerat). The yield of oil was 2.33 per cent.; its sp. gr. is 0.907, and its opt. rot —20° 34′. It is soluble in 7 or 8 parts of 80 per cent. alcohol, and has an odor much like that of cineol, and the presence of this constituent of true cardamom oil was verified by Hirschsohn's iodol reaction. Finally, the closely related

Grains of Paradise Oil was prepared and examined. The seeds of *Amomum Melequeta*, Roscoe, yield 0.75 per cent. of oil, of an aromatic but less characteristic odor than that of the above-mentioned oil. Its sp. gr. is 0.894, its opt. rot. —3° 58′, and it is soluble in 10 to 11 parts of 90 per cent. alcohol.

Monobromated Camphor—Stability.—According to Ch. Monreu, monobromated camphor is possessed of a remarkable stability; the bromine appears to be united to the carbon as firmly as in aromatic compounds. Heated to 200° with phosphoric anhydride, an energetic reaction takes place, tarry products are formed, an abundance of gas is given off, and a liquid, fuming very strongly in contact with air, is distilled over. This latter has been found to be phosphorus tribromide, the formation of which is of great interest.—Chem. News, July 16, 1897, 35; from Bull. Soc. Chim. de Paris, (3) xviii, No. 11, 1897.

Dicamphor and Dicamphendion—Production from Camphor Bromide.—It is stated in "Chem. Ztg." (xxi, 964) that dicamphor $(C_{10}H_{15}O)_2$, and dicamphendion $(C_{10}H_{14}O)_2$, are formed, along with an acid and a little camphor, when sodium is allowed to act on camphor bromide in the presence of an indifferent solvent—such as toluene—at a temperature of about 90° C. The two bodies are separated, first by crystallization from diluted alcohol, and then from petroleum ether.

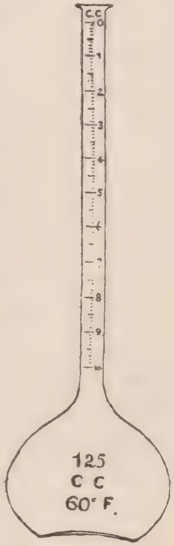
Dicamphor forms colorless needle-shaped crystals, melting at 165° to 166° C.

Dicamphendion crystallizes in yellow prismatic needles, which melt at

192° to 193° C. The two bodies yield with hydrazine hydrochloride in acetic acid solution, *dicamphenpyridazine* $(C_{10}H_{15})_2N_2$, and *dicamphenylpyridazine* $(C_{10}H_{14})_2N_2$, respectively.—Pharm. Journ., Mar. 26, 1898, 301.

Cassia Oil—Analysis.—J. Oldham Braithwaite calls attention to the great variability of the percentage of cinnamic aldehyde in different bottles of cassia oil of the same consignment, making it necessary to subject each bottle to separate analysis, or, in order to be sufficiently accurate for commercial purposes, to mix equal portions from each of the bottles of a consignment and to submit the mixture to analysis. For the assay of the oil he has had a modified form of the Herschon flask constructed (see Fig. 85), which, although trivial, is a decided improvement on the ordinary form. It consists simply of a 10 Cc. pipette, graduated in tenths, blown on to a 125 Cc. flask, the range of graduation in the flask as ordinarily constructed being only 6 Cc. The longer tube allows the pipette employed in introducing the cassia oil to hang in the neck of the flask as a kind of loose stopper during the violent reaction, which takes place on first mixing the oil with the sodium bisulphite solution; in this way it acts as a sort of a valve, preventing loss by spurting, which is apt to occur with the old form of bottle. The graduation being from top to bottom, when the level of the lower meniscus of the non-aldehydic fluid is exactly adjusted to the 10 Cc. mark, the unoccupied space in the scale may be read off directly as aldehyde.—Pharm. Journ., Nov. 6, 1897, 397.

FIG. 85.



Herschon Flask.

Oil of Cloves—Chemistry.—The investigations of Erdmann upon clove oil and the oil distilled from clove stalks have given some interesting results. It is found that while the oil from the clove stalks will yield the sesquiterpene, caryophyllene, in a pure condition by shaking it with dilute caustic alkali, the sesquiterpene from clove oil remains oxygenated. This is due to the presence of *aceteugenol* in the clove oil, along with eugenol, whereas the oil from the stalks, though containing a large amount of eugenol, is free from aceteugenol. To remove the aceteugenol from the caryophyllene of clove oil it is necessary to treat crude sesquiterpene, separated by solution of caustic alkali, with alcoholic potash and adding some ether to dissolve and separate the terpene. The alkaline solution then contains eugenol, which is separated on acidifying with sulphuric acid, and on distilling the acidified liquid acetic acid is obtained. The aceteugenol has a much higher specific gravity than eugenol, which explains the lower specific gravity of the oil from clove stalks notwithstanding the large amount of eugenol it contains. The author, furthermore, has ascertained that clove oil in addition to aceteugenol contains a compound yielding salicylic acid, and he suggests that it may be the eugenol ester of acetsalicylic acid. The occurrence of salicylic acid has previously been observed by Schenck, but disputed by Wassermann. The author confirms the observation of Schimmel & Co. that clove oil contains some furfurol, and also suggests that eugenol is probably not the only phenolic constituent of this oil, because the boiling point of the crude eugenol has a wider range than is consistent with chemical individuality, and because in redistilling it a residue of phenolic character is obtained.—Pharm. Journ., Nov. 6, 1897, 397–398; from Journ. prakt. Chem., lvi, 175.

Oil of Cloves—Aceteugenol a Factor in Thoms' Method of Assay.—Erdmann has found that oil of cloves always contains a quantity of aceteugenol, $C_{12}H_{14}O_3$, which is formed through the action of the acid constituents of the oil, and can be removed by treatment with potash solution. The substance distils at the temperature of the water-bath, and crystallizes from alcohol in rhombs, which melt at 29° C. In Thoms' benzoyl method of assaying oil of cloves aceteugenol is reckoned in, and in order to get a correct number the oil should be saponified with alcoholic potash. —Chem. & Drugg., March 5, 1898, 490; from Journ. Prakt. Chem.

Oil of Sandalwood—Physical Characteristics.—W. J. Bush & Co. call attention to the prejudice which has been caused to both buyers and sellers of sandal wood oil by some chemists accepting as absolute the figures relating to its physical characteristics published by a firm in Germany. They therefore call attention to the results of their own observations and those of others, viz.:

		Density at 15° C..	Rotation 100 Mm.	Santalol per cent.
E. M. Holmes .	Pharmaceutical Journal, March 27, 1886, p. 822.	0.971	—	—
P. MacEwan ..	Pharmaceutical Journal, February 11, 1888, p. 661.	0.970 to 0.990	—	—
Dr. Symes	Pharmaceutical Journal, February 11, 1888, p. 661.	—	—15.0°	—
Schimmel & Co.	Semi-annual Report, April, 1888.	0.970 to 0.975	—	—
Schimmel & Co.	Semi-annual Report, April, 1893.	0.975 to 0.980	—17° to 20°	not below 90 (average 97).
R. A. Cripps...	Pharmaceutical Journal, December 10, 1892, p. 461.	not below 0.970 0.976 to 0.979	—18.8°	—
M. Conroy....	Pharmaceutical Journal, September 2, 1893, p. 187.	0.972 to 0.976	—	—
J. C. Umney...	Pharmaceutical Journal, May 18, 1895, p. 1,044.	0.975 to 0.980	—16° to –20°	—
E. J. Parry.....	Pharmaceutical Journal, August 10, 1895, p. 118.	0.978 to 0.981	—	86 to 93
Squires........	"Companion to British Pharmacopœia," 1890.	0.971 to 0.980	—	—
W. J. Bush & Co. (Limited) ..	....	0.971 to 0.982	—10.8° to —17.7°	91 to 98

The rotation figures in the last case are for monochromatic (D) light, but in the other cases the source of light is not stated; the figures for ordinary light (transition tint) would with most substances be considerably higher. Messrs. Bush add that it is evident from the above recorded results that English-drawn oil from East Indian sandalwood may vary in density from 0.970 to over 0.980, and it would appear from the two sets of figures published at different times by Messrs. Schimmel & Co. that, as might be expected, the German-distilled oil varies to the same extent. The rotation also may vary from —10° to —20°, and it is not advisable to fix narrower limits than these for density and rotation. The Messrs. Bush have seldom found the rotation so low as —11°, being in the great majority of cases between —12.5° and —17°, but the lowest figure quoted (—10.8°) was from a batch distilled by them from East Indian wood, exactly as in all the other cases. They agree with previous observers as to the solubility in 70 per cent. alcohol, all the oils of their own distillation having been found to be readily soluble in less than five times their volume at 20° C.—Chem. & Drugg., Dec. 11, 1897, 932.

Sandal Oil—Test.—Hendrix proposes the following test for sandal oil: A solution of three parts of crystallized phenol in one part of alcohol is prepared. Half a Cc. of the oil is added to 2 Gm. of this mixture, in which it is perfectly soluble. Half a gramme of concentrated hydrochloric acid is then added and shaken. Pure sandalwood oil gives a yellow coloration at the zone of contact, which develops to bright red. Copaiba oil gives a mauve coloration. Cedarwood oil gives a milky solution and a brown coloration.—Pharm. Journ., May 14, 1898, 455; from Annales de Chim. Analyt., ii., 298.

Cananga Oil—Adulteration with Cocoa-nut Oil.—Schimmel & Co. (Report, October, 1897, 7), call attention to a gross adulteration of cananga oil recently obtained from Java distillers, via Amsterdam. On rectifying a sample of the oil with steam, not less than 30 per cent. of a fatty residue of a semi-fluid consistency was obtained. The saponification figure of this fat was found to be 234, and on converting the fatty acids from this into esters, these had the characteristic odor of the volatile fatty acids of cocoanut oil, which was doubtless present to the extent of at least 25 per cent. Figures are given to show in what degree the properties of pure cananga oil are altered by the addition of cocoa-nut oil. The specific gravity and the optical rotation are but slightly affected, but the saponification figure is considerably raised — from 17.8 to 83.7. Nevertheless, a higher saponification figure alone does not justify the conclusion that the oil is adulterated. As far as is known, ylang-ylang oil and cananga oil are derived from one and the same plant, the former consisting mainly of low boiling constituents, rich in esters, while cananga oil is very likely distilled from inferior material, and, in consequence, is less charged with esters. When, therefore, cananga oil yields an unusual amount of fractions of a low boiling point, higher saponification figures will be obtained. The presence of cocoa-nut oil is indicated in such by its incomplete solubility in strong alcohol; but the easiest way to recognize the addition of cocoa-nut oil is to subject the sample to a freezing mixture. Any considerable admixture of the adulterant causes a butter-like congealing of the whole mass, while pure oil remains liquid.

Guaiacum-Wood Oil—Improved Preparation for Perfumery.—Schimmel & Co. (Report, Oct. 1897, 29) observe that the exquisite tea-like odor of guaiacum-wood oil links it with all the finer flower odors, like rose, geranium, &c., for the purposes of perfumery. In its congealed condition, which is due to the presence of an inodorous crystalline alcohol, called guajol, it answers well for scenting soaps; but for the purposes of fine *extraits*, this crystalline constituent should be removed. Oil so treated—designated as liquid guajac oil—should be kept moderately warm during the winter months, as otherwise slight crystallization may take place.

Guaiacum-Wood Oil—Botanical Source of the Wood.—Messrs. Schimmel & Co. (Report, April, 1898, 28) are informed by a reliable person that "guaiacum wood," from which the oil is distilled and which is known as "Palo balsamo," is derived from *bulnesia sarmienti*, Lorentz, a *zyzophylleæ* growing wild in Argentina, and described by Griesbach in 1879, who states that it is named "palo santo" (holy wood) by the aborigines. The name—*lignum sanctum*—is however also used for the wood of *guaiacum officinale* and *guaiacum sanctum*, as well as for that of *porlieria hygrometrica*, R. & P., a tree belonging also to the zyzophylleæ and growing in Chili. Until further, more decisive evidence is obtained, the derivation of guaiacum wood from *bulnesia sarmienti* must therefore be regarded as being still undecided.

Oil of Xanthorrhœa Gum—Characters.—Schimmel & Co. (Report, Oct., 1897, 60), obtained on distilling the yellow gum resin of some Australian grass-trees—probably *xanthorrhœa hastities*, R. B., 0.37 per cent. of a yellow oil of an odor resembling that of styrax. It has the sp. gr. 0.937, its optical rotation is —3° 14′, and its saponification number, 74.3; factor of acidity, 4.9; factor of esters. 69.1. When the oil was saponified by an alcoholic solution of potash, quite an amount—about 20 per cent.—of cinnamic acid was separable from the lye.

Oil of Bisabol Myrrh—Characters.—W. Tucholka has extracted the volatile oil from Bisabol myrrh, a product from the interior of the Somali country. It was obtained by shaking the alcohol extraction of the myrrh with petroleum ether of a low boiling point, evaporating the petroleum ether, and distilling the residual oil by steam. So obtained, the oil is light yellow, has a characteristic odor, a sp. gr 0.8836, optical rotation —14° 20′, and boils at 220° to 270°. The yield was 7.8 per cent. of the gum-resin. It contains a hydrocarbon which differs from the terpenes so far known, to which the author gives the name "bisabolene." A large proportion of the oil consists of an oxygenated component to which the author assigns the remarkable formula $C_{36}H_{96}O$.—Schimmel's Report, Oct., 1897, 36; from Arch. de Pharm., *235*, 289.

Oil of Gaultheria—Early History in Medicine and Pharmacy.—From the records in the Lloyd Library, Prof. John Uri Lloyd has compiled an interesting paper on the early history of oil of gaultheria. The author observes that the first record of the therapeutical use of this oil is to be found in empirical medicine, it having been introduced early during this century in the then popular nostrum known as "Swain's Panacea." His investigations are summarized as follows: "Oil of gaultheria was distilled for druggists previous to 1820, but no public description of the apparatus was printed." "The Pharmacopœia of the United States, 1820, gave the first method of making it." "It was prominently introduced to the profession by the New York Medical Society, 1827, under whose auspices the oil was established as a characteristic constituent of Swain's Panacea, the report being published in 1829." "No pharmacopœial directions for making oil of gaultheria from any source whatever precedes the first (1820) Pharmacopœia of the United States, and no reference to its being made from gaultheria or sweet birch preceding Bigelow, 1818." "Thus it is evident that while the plant gaultheria has the advantage concerning conspicuity of name, the same date of introduction and the same reference (Bigelow) must be ascribed to both oil of gaultheria and birch."

In explanation of the last paragraph it is necessary to mention that Bigelow, in his "Amer. Med. Botany" (II, p. 28), Boston, 1818, mentions that the same oil may be distilled from *gaultheria procumbens*, *g. hispidus*, *spiræa ulmaria*, the root of *spiræa lobata*, and is particularly distinct in the bark of the sweet birch, *betula lenta*.—Pharm. Review, May, 1898, 176–179.

Natural Wintergreen Oil—Presence of an Irritant Body.—Vidal, having noticed that some samples of oil of wintergreen caused irritation to the skin, amounting even to poisonous eruption in some cases, investigated the matter, and found that irritation invariably followed the use of the natural oil, while the use of the synthetic oil on the same subject was not followed by discomfort. It is evident, therefore, that the natural oil of wintergreen contains some irritant body which is not present in synthetic oil.—Pharm. Journ., Nov. 27, 1897, 459; from Nouv. Rém., xiii, 615.

Methyl Salicylate—Plants in Which It is Known to Occur.—With the object of collecting data and preparing the field for the next Committee of Revision of the U. S. P., Edward Kremers and Martha M. James have, with the assistance of Dr. R. H. True, sifted the literature on the occurrence of methyl salicylate in the vegetable kingdom, and present the results as a preliminary report of Research Committee G, on the subject of the assay of esters occurring in volatile oils. Taking the plants in the order of their families, as given by their authors, and the species names according to the Index Kewensis, the following very briefly records the plants in which methyl salicylate is known to exist and those in which its existence is probable but not proven.

Betulaceæ.—It is generally accepted that *betula lenta*, L., supplies at least the large bulk of the natural methyl salicylate of commerce. Its presence has not been proven in either *b. alba*, L., or in *b. lutex*, Michaux.

Lauraceæ—Schimmel & Co. claim to have obtained salicylic acid from an oil distilled by them from *laurus benzoin*, L., which is apparently synonymous with *lindera benzoin*, Meissn., *benzoin odoriferum*, Schmidt, and benzoin benzoin (L.) Coulter. Experiments made with some twigs of the plant furnished by Prof. Wm. Trelease, director of the Missouri Botanical Garden, failed to reveal the presence of the ester.

Rosaceæ.—The flowers of *spiræa ulmaria*, L., were shown by Schneegans and Gerock (1892) to contain methyl salicylate. Previous to that time the meadow-sweet was known to contain salicylaldehyde.

Erythroxylaceæ.—According to Van Romburgh, the ester occurs in *erythroxylum* (*on*) *coca*, Lam., and, in traces, also in *e. bolivianum ?*

Polygalaceæ.—The ester has been found in *polygala senega*, L.; *p. senega*, L., var. *latifolia*, Torrey and Gray; *p. baldwinii*, Nutt; *p. variabilis*, H. B. K. (*p. albiflora*, D. C.); *p. oleifera* (?) Heckel (not mentioned in the Index Kewensis); *p. javana*, D. C.; *p. serpillacea*, Weihe; (*p. depressa*, Wenderoth, ?); *p. calcarea*, F. Schultz; and *p. vulgaris*, L.

Pyrolaceæ.—A substance having the odor of methyl salicylate, and some crystals of salicylic acid, have been obtained by Bourguelot from *Hypopitys multiflora*, Scop. (*monotropa hypopitys*, L.).

Ericaceæ.—The ester is known to exist in *gaultheria procumbens*, L. Other species that are reported to contain methyl salicylate are: *g. fragrantissima*, Wall. (syn. *g. punctata*, Blume and *g. leschenaultii*, D. C.), and *g. leucocarpa*, Blume.—Pharm. Review, March, 1898, 100–105.

Methyl Salicylate—Distinction between Natural and Artificial.—Adrian proposes the following test for distinguishing between natural oil of wintergreen and artificial methyl-salicylate, which depends upon the reaction of the terpene—gaultherilene—in the natural oil with concentrated sulphuric acid. About 5 Cc. of the sample are carefully poured on a like quantity of concentrated sulphuric acid. In the case of a synthetic oil there is only a slight development of heat and a faint pink coloration; whereas, in the case of natural oil, a decided heat is rapidly developed, and the oil assumes a pink color, changing to wine-red, and finally to reddish-brown.—Merck's Rep., June 15, 1898, 369.

Methyl Salicylate—Volumetric Method of Determination.—Edward Kremers and Martha M. James propose a method for the volumetric determination of methyl salicylate which is based upon the volumetric determination of phenols—phenol, thymol, naphtol and salicylic acid—communicated by Messinger and Vortmann in 1890. In this, an alkaline solution of salicylic acid, containing at least four molecules of sodium hydrate to one molecule of the acid, is treated with an excess of $\frac{N}{10}$ iodine V. S. at a temperature of 50° to 60° C., when, after the solution has been slightly warmed, a bright red precipitate of the alkali salt of diiodo-salicylic acid—$C_6H_3I(OI)COOM'$, is formed, and its amount increased upon acidulation. The directions for the titration are as follows: 2–3 g. of the acid are dissolved in soda solution, so that at least four molecules of soda are present for each molecule of acid. The solution is diluted to 250 or 500 Cc. Of this solution, 5 or 10 Cc. (measured accurately) are transferred to a flask and heated to about 60°. Sufficient $\frac{N}{10}$ iodine V. S. is then added to impart to the solution a decided yellow color due to the excess of iodine. Upon shaking, a deep red precipitate results. Upon cooling, the solution is acidulated with dilute sulphuric acid and subsequently diluted to 250 or 500 Cc. In an aliquot part of the filtrate (about 100 Cc.) the excess of iodine is determined by means of $\frac{N}{10}$ thiosulphate V. S. The factor is derived the following manner:

$$\frac{\text{1 mol. salicylic ac.}}{\text{6 atoms iodine}} = \frac{137.67}{759.24} = 0.18132606.$$

Inasmuch as an alkaline solution of salicylic acid results readily upon saponification of methyl salicylate, this process should be equally applicable to the assay of the ester, and has been applied by the author as follows: 5.4998 Gm. of methyl salicylate were dissolved in the required amount of soda solution, saponification effected and the saponified solution after cooling was diluted to 500 Cc. Of this solution exactly 10 Cc. were heated as directed and 53.62 Cc. of $\frac{N}{10}$ iodine V. S. added and the solution was shaken and diluted to 500 Cc. One hundred Cc. of the filtrate required 2.09 Cc. $\frac{N}{10}$ thiosulphate V. S. to remove the excess of iodine. One-fifth of the total quantity of iodine solution used is 10.72 Cc. The amount of iodine actually consumed in $\frac{1}{5}$ of the experiment is 8.63 Cc. This number multiplied by 0.631825 [$\frac{1}{50} \times \frac{1}{5} \times 0.0025273$ (the methyl salicylate factor for $\frac{N}{10}$ iodine V. S.)] will give the amount of methyl salicylate, viz. 5.4649 or 99.17 per cent. indicated by this experiment. A number of determinations according to this method were made with the same oil, using about 3 Gm. for a weighing. The following percentage results were obtained: 99.1; 99.1; 98.7; 99.3; 99.8; 99.7. The last three results show that after a little experience satisfactory results can be obtained. —Pharm. Review, April, 1898, 130–133.

Synthetic Almond Oil—Production free from Chlorine.—Schimmel & Co. (Report, April, 1898, 6) state that synthetic almond oil (benzaldehyde) is now produced on a large scale free from chlorine, and that recent experiments made have established the fact that the color of soap perfumed with such oil remains unimpaired on both extended storage and exposure to full daylight. The soap retains its white color just as much as when flavored with true volatile oil of bitter almonds deprived of hydrocyanic acid. They, therefore, feel justified in recommending the use of chlorine-free artificial oil of bitter almonds for perfuming almond soap.

ALCOHOLS AND DERIVATIVES.

Absolute Alcohol—Preparation by the Use of Calcium Carbide.—M. P. Yvon observes that when coarsely powdered carbide of calcium is brought in contact with concentrated (90 to 95 per cent.) alcohol, the carbide is fairly vigorously attacked, and continues to give off acetylene as long as any water remains in the alcohol; when the latter is quite anhydrous, the disengagement of gas ceases. The use of carbide of calcium, therefore, enables not alone the determination whether an alcohol is anhydrous, but also the convenient preparation of absolute alcohol by one, or at most, by two distillations. To prepare absolute alcohol it suffices to place a quantity of alcohol of 90 to 95 per cent. in a flask, with one-quarter its weight of carbide of calcium reduced to a coarse powder. The disengagement of gas, at first very vigorous, soon calms down; the flask is then frequently shaken up during two or three hours, and then left alone for twelve hours. It is then best to make quite certain that shaking no longer gives rise to any disengagement of gas; in the contrary case we prolong the agitation and the contact of the alcohol with the carbide, if necessary adding a little more of the latter; we then transfer the mixture to a distilling apparatus, and proceed with the separation of the alcohol, though putting on one side the first portions collected, as they hold a small quantity of acetylene in solution. It is advisable to keep the first portions far away from any flame, as they consist of a mixture of alcohol and acetylene. The alcohol afterwards collected is anhydrous, if the operation has been properly conducted.—Chem. News, Jan. 28, Febr. 4, 1898, 52; from Compt. rend. (No. 86), 1897.

Alcoholic Fermentation—Products when Incited by Moulds—Emmerling has determined the products of the alcoholic fermentation induced by moulds, and finds that in relation to the alcohol produced, the glycerin amounted to 8.3 per cent. and the succinic acid to 1.4 per cent. These proportions are the same as in the case of alcoholic fermentation caused by yeast, which, as demonstrated by Pasteur, are constant within certain limits.—Pharm. Journ., July 3, 1897, 3; from Ber. d. D. Chem. Ges., 1897, 454.

Alcohol—Substitution in Therapeutics for Fermented and Distilled Beverages.—Dr. N. S. Davis discusses the therapeutic properties of alcohol, and gives reasons why the fermented and distilled liquors used as beverages should not be recognized in the Pharmacopœia as medicinal agents. He observes that if it is true that alcohol, when taken into a living system in large doses, is an active poison, quickly destroying animal life, and in smaller doses is an anaesthetic, directly diminishing cerebral sensibility and mental conciousness and retarding all metabolic changes, both in the blood and tissues, it follows as a logical and necessary inference that, if administered as a medicine, it should be done with the same care and exactness in regard to purity, dose and time that we exercise in prescribing morphine, quinine, aconite, arsenic or any other active drug. This cannot be done by using any of the various fermented and distilled liquors ordered either from drug stores or liquor dealers, since they are kept at no uniform standard of either strength or purity. The present Pharmacopœia recognizes as medicine, vinum or wine, spiritus frumenti or whisky and spiritus vini gallici or brandy, but does not give a definite official standard for any of them. Neither does it give any reliable and readily available tests by which the strength and purity of the article can be determined by the ordinary practitioner of medicine. Repeated analyses have shown that the amount of alcohol in different samples of wine varies from 6 to 25 per cent.; in whisky, from 35 to 50 per cent.; and in brandy from 40 to 60 per cent. Such variations in the strength of any other medicine would quickly cause its standard to be corrected, or its exclusion from the official list of drugs. As alcohol is the only important therapeutic agent in all these liquors, why not let pure alcohol of fixed strength be officially recognized to the exclusion of all the varieties of both fermented and distilled drinks? Why should the physician prescribe the uncertain mixtures called beer, wine, whisky or brandy, when his sole object is to obtain the therapeutic effects of alcohol? Much has been said and written concerning valuable nutritive constituents in the different varieties of wine; but the quantity of such constituents, as shown by the record of numerous analyses, is so limited that it would require several barrels of wine to furnish the equivalent of a pound of bread. It would therefore be more scientifically accurate for every physician to prescribe such doses of pure alcohol and water to be given with each quantity of sugar, milk, or meat broth, as he thought his patient might need. This would be a long and very important step in advance, both in the interest of scientific accuracy and of humanity; and if the beverages named were excluded from pharmacopœial recognition, and the consequent changes adopted and carried out in practice, the physician would know what his patient was getting and how much, the pharmacist would no longer be classed among the licensed liquor dealers, and both would be relieved from the odium of fostering the liquor traffic.—Am. Journ. Pharm., Oct., 1897, 516, 520; from Journ. Amer. Med. Assoc., Aug. 21, 1897.

Fermented and Distilled Liquors—Desirability of Pharmacopœial Definition.—Joseph W. England, referring to the recommendation of Mr. Morrison that fermented liquors be not recognized by the U. S. P. as medicinal agents, but more particularly to the paper of Dr. N. S. Davis, above quoted, makes some sound arguments for their retention in the Pharmacopœia, and corrects some errors in the statements of Dr. Davis. If these liquors have sufficient therapeutic worth to warrant their use in medical practice, they should be retained; if not, they should be dismissed. But so long as "liquors" are prescribed by a majority of physicians, and used by the sick, so long should our national guide-book recognize them, and demand a standard quality. One of the errors in Dr. Davis's paper is the charge that the U. S. P. does not give a definite official standard for either wines or liquors. As a matter of fact, it does give a standard of alcoholic strength and of quality for both, and provides particularly that the distilled spirits—brandy and whisky—shall be free from fusel oil. Mr. England, also, takes issue with Dr. Davis on the statement that alcohol is the only important therapeutic agent in all liquors. The ethers produced in liquors by aging, and the extractive matter contained in wines and brandies, are, in the light of chemical testimony, not to be regarded as being without therapeutic worth, and therefore, before any action is taken by the Committee on Revision of the United States Pharmacopœia looking towards the dismissal of these products, there should be a thorough and extended examination made of them, chemically and therapeutically. In this connection, the author makes some interesting observations concerning the effect of age upon

Whisky, by which he confirms the observation made by the late Prof. John M. Maisch, who had examined many barrels of whisky during the Civil War for the government, that the best whiskies were invariably those that had the highest acidity. The author finds, in an experience extending over a number of years, that, generally, the oldest, fusel-oil-free, highest-priced, and most strongly alcoholic whisky has the highest acidity. He notes, furthermore, that the acidity of whisky does not increase with age beyond a certain point, and that occasionally there are exceptions to the rule of high acidity and age; as when a rare whisky has been so refined before aging that it will not have the usual amount of the acid-forming compounds, and hence will show a low acidity. The acidity is generally assumed to be due to valerianic acid. The value of its presence is evidently not fully recognized by the U. S. P., which demands that whisky should be at least two years old, but also that 100 Cc. of it should require not more than 1.2 Cc. of normal potassium hydrate solution to render it distinctly alkaline to litmus. Mr. England records numerous examinations of old whisky in which 1.6 and 1.7 Cc. were required, and in isolated cases as much as 1.8 and 1.9 Cc. The U. S. P. (1890) standard is, therefore, too low, and should be at least 1.4 or 1.5 Cc. That of the U. S. P. (1880) was 2.0 Cc.—Amer. Journ. Pharm., Nov., 1897, 580–584.

Cider—Value of Salicylic Acid and Calcium Sulphite as Preservatives.—

E. H. S. Bailey and Charles A. Palmer have made experiments to determine the preservative influence exerted upon cider, and hence on other fermentable liquids, by salicylic acid and by commercial calcium sulphite. The attempt was made to imitate, as far as possible, the conditions under which these substances are used by persons who have no special knowledge of preservatives. A measured quantity of the cider was placed in each of six flasks, which were loosely covered with watch glasses, and set aside under ordinary atmospheric conditions, the temperature varying from 12° to 22° C. The cider used for the experiments with salicylic acid initially contained 2 per cent. of alcohol. The amounts added are shown under Nos. 1 to 5, and range from 1 : 20000 to 1 : 500, No. 6 and No. 6 (a) being cider without addition of preservative. The second table shows the results of experiments made with calcium sulphite, the cider used in this case containing at the beginning 3 per cent. of alcohol.

Experiments with Salicylic Acid.

Strength.	Per cent. of alcohol.					Per cent. of acetic acid.	
	24h.	72h.	8d	22d.	52d.	52d.	112d.
No. 6, blank.....	0.3	1.0	3.2	5.9	3.2	3.6	7.38
No. 1, 1 : 20000 ..	0.3	0.8	3.2	5.9	1.5	5.8	7.38
No, 2, 1 : 10000 ..	0.3	0.7	3.2	5.9	2.3	5.0	7.87
No. 3, 1 : 5000 ...	0.3	0.5	2.7	6.0	2.6	4.7	7.79
No. 4, 1 : 1000 ...	0.3	0.3	0.3	4.0	4.8	0.4	0.4
No. 5, 1 : 500	0.3	0.3	0.3	0.4	0.4	0.58	0.6
No. 6, (a) blank .	1.0	1.2	2.3	5.3	6.3	1.6	3.48

Experiments with Calcium Sulphite.

Strength.	Per cent. of alcohol.						Per cent. of acetic acid.	
	24h.	72h.	8d.	22d.	52d.	112d.	52d.	112d.
No. 1, 1 : 250	0.3	0.3	0.2	0.6	0.4	3.9	0.57	0.41
No. 2, 1 : 500	0.3	0.3	0.3	0.3	5.4	3.9	0.48	0.41
No. 3, 1 : 100	0.3	0.3	0.3	3.9	6.1	3.	0.41	0.41
No. 4, 1 : 2000 ...	0.3	0.4	0.9	4.8	6.3	4.0	0.41	0.41
No. 5, 1 : 4000 ...	0.3	0.6	1.5	5.0	6.2	2.2	0.41	3.00
No. 6, blank.....	1.0	1.2	2.3	5.3	6.3	2.2	1.62	3.48

From this it seems that a 1 · 5000 solution of salicylic acid does have a noticeable effect upon the alcoholic ferments and the mycoderma seems to do very well in the 1 : 1000 solution. In the end, however, it is probable that the maximum amount both of alcohol and of acetic acid are produced, as the last distillations and titrations indicate in the case of Nos. 1, 2, 3 and 6. The alcohol produced would theoretically yield just about the amount of acetic acid that is really found.

Not as much work has been done heretofore on the action of sulphurous acid and the sulphites on ferments, as upon the action of salicylic acid. The table shows that even the solution 1 : 1000 is incapable of preventing the fermentation of cider for more than three weeks.—Proc. Kans. Pharm. Assoc., 1897, 21–23.

Ether—Influence of the Presence of Sulphonic Acids on Its Preparation.—L. Prunier states that in the study of the preparation of ordinary ether by means of sulphuric acid and alcohol, most workers have omitted to take notice of the presence of sulphonic acids and their derivatives. This group of bodies is, however, to be found in notable quantities in commercial ethers. It is also found in considerable proportions in the oils which have been used in the rectification of the raw product. By direct experiment it is possible to prove the formation of several sulphonic derivatives, especially towards the end of the operation. To separate the derivatives actually formed by the action of sulphuric acid, it suffices to heat sulphovinic acid with dilute sulphuric acid to 140°, then add a little alcohol. By this means a small quantity of ordinary ether is formed, and several sulphonic derivatives of varying volatilities, some of which even distil over with the ether. They are formed in greatest abundance when the temperature exceeds 140°, and above all if undiluted sulphuric acid be used. It is exactly the same as in the preparation of ethylene; if the operation be interrupted when the liquid becomes dark (165° to 175°) we can at that moment detect the presence of a large quantity of sulphonic compounds which exist in the liquid, along with the sulphuric acid in excess, traces of sulphovinic acid, neutral sulphuric ether, polyethylenic compounds, and also sulphurous acid.—Chem. News, July 16, 1897, 35; from Journ. de Pharm. et Chim. (6) v, No. 11.

Ether—Detection of Water.—James Grier communicates results of experiments made to determine the relative efficiency of carbon bisulphide and benzene in determining the presence of water in ether by the turbidity produced when added to the latter in certain proportions. He found carbon bisulphide to be the most delicate reagent, giving a turbidity with samples of ether, which with benzene remained clear. From the figures given, the former will detect as little as $\frac{1}{10}$th per cent. of water added to anhydrous ether free from alcohol, whereas benzene does not detect $\frac{1}{2}$ per cent. The presence of alcohol, however, exercises a marked influence on the experiments, but here also with a difference in favor of the carbon bisulphide; the presence of 18 per cent. of alcohol being necessary to make it impossible to detect 1 per cent. of water by means of the latter, while only 8 per cent. of alcohol was required to nullify the benzene test. —Pharm. Journ., March 19, 1898, 294.

Ether—Estimation of Aldehyde and Purification.—M. Francois states that the almost constant presence of ordinary aldehyde in so-called pure ethers, even that used for anæsthetic purposes, does not appear to have attracted sufficient attention from pharmacologists, yet ether containing several units per cent. of aldehyde as impurity is not unfrequently met with. It occurred to him to make use of the action of bisulphited rosaniline for the estimation of the aldehyde in ether, and to apply to this estimation the colorimetric method of Mohler, in which the reddish-violet coloration, produced by the action of the colorless solution of bisulphited rosaniline, reveals the presence of aldehyde in alcohol. Applied to ether, the method requires some modifications, which are described. The reagent is made by adding 30 Cc. of a 1 : 1000 solution of ordinary fuchsine (not acid) to 220 Cc. of a saturated aqueous solution of sulphurous acid, and adding to this 3 Cc. of sulphuric acid of 66°. The estimation is made by adding this reagent to a mixture of equal volumes of alcohol and the ether, and comparing the intensity of color produced with that simultaneously produced in known mixtures of pure alcohol, pure ether and pure aldehyde.

The removal of aldehyde from ether is easily accomplished by the action of potassium permanganate in alkaline solution. The ether is shaken in a liter flask with a mixture composed of 20 Gm. of caustic soda and 200 Cc. of saturated solution of potassium permanganate. After twenty-four hours, the ether is decanted, and the same treatment is repeated. It is then decanted into a flask containing 50 Gm. each of quick-lime and fused calcium chloride, allowed to remain in contact for twenty-four hours, then filtered and distilled.—Chem. News, July 2, 1897, 7, 8; from Jour. de Pharm. et de Chim., 1897, No. 11.

Ethyl and Amyl Nitrites—New Method of Valuation.—Carl E. Smith, in search of a method for the estimation of ethyl and amyl nitrites, with the view to encouraging pharmacists to make their own valuation of spirit of nitrous ether and amyl nitrite, has succeeded in adapting a method very recently proposed for alkali nitrites. The method is readily applied by any one who is acquainted with the rudiments of volumetric analysis, requires only the ordinary apparatus employed, and, what is its best recommendation, is capable of greater accuracy than the gasometric method which is in general use at present, the results of which, moreover, the author finds are always too low in the estimation of ethereal nitrites. After giving an account of the experiments made in connection with numerous methods that have heretofore been proposed—the U. S. P., Dott's, Walker's, Curtman's, Grützner's, Allen's, etc.—the author gives the details of his proposed method, adapted from that proposed by B. Grützner for the valuation of alkali nitrites.

The valuation of spirit of nitrous ether, is as follows:—Into a 100 Cc. flask or bottle of white glass, provided with a loosely fitting stopper of glass, rubber or cork, place successively 10 Cc. of distilled water, 5 Cc. of a cold, aqueous, saturated solution of potassium chlorate, 5 Cc. of the spirit to be tested, and 5 Cc. of 10 per cent. nitric acid. Quickly insert the stopper and shake frequently during thirty minutes. Then add 10 Cc. of $\frac{N}{10}$ silver nitrate, shake briskly for a moment, add 10 drops of ferric ammonium sulphate solution, and titrate the excess of silver with $\frac{N}{10}$ potassium sulphocyanate, *without delay*, so that the darkening of the precipitated silver chloride may not obscure the end reaction. This is reached, when, after *momentary* shaking, upon the addition of the last drop of solution, the appearing red color is not entirely dispersed, but leaves the liquid faintly reddish throughout. Assuming the spirit to contain 4 per cent. by weight of ethyl nitrite, and to have a specific gravity of 0.84, it would require 2.55 Cc. $\frac{N}{10}$ potassium sulphocyanate to precipitate the excess of silver in solution; and as each cubic centimeter of $\frac{N}{10}$ silver nitrate consumed in precipitating the chloride formed corresponds to 0.0225 Gm. of ethyl nitrite, the calculation is as follows:

$$\frac{(10-2.55)\times 0.0225\times 100}{5\times 0.84}=4.0 \text{ per cent.}$$

If it is desired to avoid calculation entirely, however, 2.7 Cc. of spirit of nitrous ether and half the quantities of the reagents may be taken, in which case each cubic centimeter of $\frac{N}{10}$ silver nitrate consumed indicates 1 per cent. of ethyl nitrite.

The valuation of amyl nitrite is made by first diluting the amyl nitrite with alcohol so as to make a 5 or 6 per cent. dilution. Then, using just double the quantity of this (= 10 Cc.) and the reagents in the same doubled proportion, the process is carried out exactly as in the case of spirit of nitrous ether, assuming the alcoholic dilution to contain 6.037 Gm. of the sample in 100 Cc.; the 10 Cc. taken for assay contain 0.6037 Gm. If in titrating the excess of silver, 5.45 Cc. of $\frac{N}{10}$ potassium sulphocyanate are required, (20—5.45) 14.55 Cc. of $\frac{N}{10}$ silver nitrate—each cubic centimeter equivalent to 0.0351 Gm. of amyl nitrite—have been consumed in precipitating the chloride formed in the reaction, and the calculation is as follows:

$$\frac{14.55\times 0.0351\times 100}{0.6037}=84.6 \text{ per cent.}$$

The author also gives the results of the examination of commercial samples of spirit of nitrous ether and of amyl nitrite fairly representing the American market, to which reference must be had in the original. It is noteworthy, however, that these results show a fairly good condition of the market, and that in each case the figures obtained by the author's method —which may properly be called the "Chlorate Method"—are higher, and, as he believes, more correct than those obtained by the gasometric method of the U. S. P.—Amer. Jour. Pharm., June, 1898, 273–285.

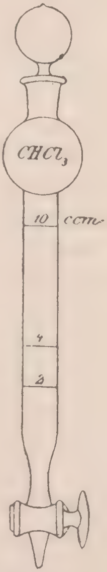
Ethyl Nitrite—Estimation in Spirit of Nitrous Ether.—Dietze recommends a method of estimating the ethyl nitrite in spirit of nitrous ether, which depends upon the reduction of potassium chlorate to chloride according to the following equation :

$$3C_2H_5NO_2 + KClO_3 = KCl + 3C_2H_5NO_3.$$

It follows that titration of the mixture with standard silver nitrate will give an index to the amount of nitrite present, and the process is well spoken of by Beuttner in the Apoth. Zeit. To make the assay mix 10 Cc. of the spirit with 20 Cc. of 5 per cent. chlorate solution and 5 per cent. of nitric acid (sp. gr. 1.153), shake occasionally for an hour, then titrate with decinormal silver nitrate solution. Each Cc. of the latter solution is equal to 0.0225 Gm. of ethyl nitrite.—Chem. and Drugg., Mar. 5, 1898, 400.

Pure Chloroform—Decomposition by Artificial Light.—Dr. J. J. Waddelow describes how the vapor of pure chloroform was decomposed by artificial light during an operation. The room in which the operation was performed was small, not ventilated, warmed by an oil stove, and illuminated by an oil lamp and a candle. Some of the chloroform was accidentally spilt, and almost immediately a most pungent disagreeable odor was noticed, whilst the whole respiratory tract was affected. Violent attacks of coughing seized the operator and his assistants, and it was five days before the irritative effects passed away in one case. The room was pervaded by a strong odor of chlorine the morning after the operation.—Pharm. Journ., April 2, 1898, 324 ; from Lancet, 3889, 749.

FIG. 86.



Chloroform—Decomposition in the Animal Organism.—In some experiments with dogs, A. Dresgsez and N. Nicloux found that the quantity of carbonic acid in the blood increased in one case from 1.6 Cc. per litre to 2.9 Cc. after three hours ten minutes of anæsthesia. Similar experiments on larger dogs showed even a greater differeece. The authors, therefore, state that these experiments confirm certain conclusions already arrived at by them by means of their fire-damp meter—that chloroform is decomposed in the animal economy with formation of carbonic oxide.—Chem. News, April 7, 1898, 165 ; from Compt. rend. March 7, 1898.

Chloroform—Determination of Alcohol.—Béhal and Francois determine the alcohol in chloroform by a modification of the method proposed by Nicloux, which depends upon the conversion of the alcohol into acetic acid by potassium dichromate and sulphuric acid, the quantity of alcohol being determined by that of dichromate consumed. The apparatus employed for this method is shown by Fig. 86. It consists of a tube provided with a stop-cock beneath and a ball extension above, into the neck of which a glass stopper is accurately ground, while for the purpose of convenient measurement, divisions showing 2, 4, and 10 Cc. are edged on the tube, as shown in the drawing. The chloroform, 10 Cc., is first introduced, then sulphuric acid to the mark 4 Cc., and the two fluids are well shaken and allowed to rest; the acid is then withdrawn, and the residual chloroform again shaken with a fresh portion of 2 Cc. of acid; this separates as before, and the process is twice repeated, so that 10 Cc. of sulphuric acid are used in all. This acid, containing the alcohol from the chloroform, is now distilled with 40 Cc. of water until 20 Cc. of distillate are obtained. Of this, 5 Cc. are titrated with a solution of 16.97 Gm. of $K_2Cr_2O_7$ in a liter of water, 1 Cc. of which corresponds to 0.005 Cc. of alcohol, the dichromate solution being added from a burette in drops to the alcoholic liquid heated in a glass vessel on a water-bath, and previously mixed with 2 Cc. of concentrated H_2SO_4.—Pharm. Ztg., Aug. 4, 1897, 528.

Iodoform—Electrolytic Method of Preparation.—F. Foerster and W. Meves suggest an improvement in the electrolytic method for preparing iodoform. The dilute solution, containing alcohol, soda and potassium iodide, heated to 65° or 70° C., is subjected to a current of 1 ampére. The reaction ensues according to the equation—$C_2H_6O + 5I_2 + H_2O = CHI_3 + CO_2 + 7HI$. If a current of 3 or more ampéres is employed, as recommended by Elbs and Herz, a certain amount of potassium iodate is produced.—Pharm. Jour., June 25, 1898, 586; from Jour. f. prakt. Chem.

Iodoform—Decomposition by Light.—In view of the great diversity of opinion with regard to the action of light on iodoform, G. Fleury has made experiments by which he shows that, as a rule, this decomposing action is of very limited extent, and he thinks that this limit may be attributable to immediate coloring of the liquid to reddish-brown by the liberated iodine stopping the violet and ultra-violet rays on the surface, and thus preventing the continuance of the chemical reaction. With the idea of proving the correctness of this theory, some iodoform—dissolved in a mixture of alcohol and ether—was placed in a flask of white glass, in the presence of an excess of finely-divided silver. It was then exposed to sunlight, both direct and diffused, and frequently shaken to accelerate the combination of the liberated iodine with the silver. After several days, the liquid no longer became colored, and on collecting and weighing the mixture of silver and iodide, the amount of iodine resulting from the decomposition was calculated and found to be the exact theoretical amount.—Chem. News, Oct. 8, 1897, 183; from Jour. de Pharm. et Chim. (6) vi., No. 3, 1897.

Iodoform—Substitutes that have been proposed.—The "American Druggist" (Oct. 10, 1897, 214), enumerates and describes the followiug substitutes for iodoform that have so far been proposed in recent years: *Iodol*, *losophan, iodo-salicylic acids, sozoiodol, aristol, europhen, loretin, airol, di-iodoform, antiseptol, dermatol, thioform, thioresorcin, iodo-gallicin, iodoterpin.*

Eka-Iodoform — A New Substitute for Iodoform. — Under the name "eka-iodoform," a mixture of iodoform and paraform has been introduced as possessing advantages over iodoform. Dr. Thomalla has employed it with advantage in all cases where iodoform had hitherto been used, and he finds that, while having decided antiseptic properties, it never produces irritation.—Pham. Centralh., 1897, 465.

Aldehyde—Characteristic Color Reaction.—Louis Simon observes that the property of producing a beautiful red coloration with nitro-prussiate of sodium and potash, either with or without the subsequent addition of acetic acid, is shared by ordinary ethylic aldehyde with a large number of aldehydic and ketonic bodies; but, on the other hand, the following reaction, viz., adding a few drops of aqueous methylamine and a few drops of dilute nitroprussiate to a weak solution of ordinary ethylic aldehyde, gives a beautiful blue color which is quite characteristic.—Chem. News, Jan. 21, 1898, 29; from Comptes Rendus, cxxv., No. 25.

Paraldehyde.—A delicate reagent for *Iodine,* which see under "Inorganic Chemistry."

Chloral—Spontaneous and Rapid Polymerization.—J. W. Mallet calls attention to the rapid polymerization of a specimen of anhydrous chloral contained in an original vial with a small drawn-out neck hermetically sealed. It had been on hand for more than a year, and had originally been quite clear, but now contained a few small white flocks—probably of polymeric meta-chloral due to traces of sulphuric acid. After exhibiting this sample on the lecture table, and handling by several persons, it was removed to the collection room whence it had come. Next morning on entering the room the remains of the vial were scattered in small fragments throughout the room, while a thin crust of white meta-chloral covered the table on which the vial had been placed in a circle half a meter in diameter. The vial having been absolutely undisturbed, it seems that from some cause, which it is difficult to explain, polymerization must have taken place so rapidly, and to so large an extent, that the heat evolved in the unison of the smaller into the larger molecules raised the temperature of the remaining liquid to a point at which the tension of its vapor was more than the vial could stand. This is the more remarkable when it is remembered that liquid chloral is only about as volatile as water—has about the same boiling point under atmospheric pressure—and that the vial had been exposed to less mechanical agitation, less change of temperature, and less external disturbance of any kind at the time the change occurred than the specimen had previously been exposed to.—Chem. News, Dec. 10, 1897, 280; from Amer. Chem. Journ., Nov., 1897.

Chloral Hydrate—Reaction With Ammonium Sulphide.—Joseph Lesinsky and Charles Gundlich, while studying the reaction of chloral hydrate, observed that, when dissolved in water and mixed with ammonium sulphide, it threw down a precipitate only after a certain time had elapsed, but then, after the lapse of a certain number of seconds, this precipitation was instantaneous, and, furthermore, that it invariably occurred in the same number of seconds, provided the temperature was the same. Freshly prepared ammonium sulphide does not answer well, the best results being obtained when, after several days' standing, the solution became one of the polysulphides. The reaction is shown under the following conditions: Two Gm. of chloral hydrate are dissolved in 25 Cc. of water, 10 Cc. of this solution are run out of a burette into a narrow beaker, and 5 Cc. of yellow ammonium sulphide poured in, not run in, then quickly mixed by shaking the mixture slightly, and the beaker placed on white paper so that the sudden appearance of the precipitate can be easily seen. This occurs at 1° C. in 44 seconds; at 20° C. in 19, at 45° C. in 8 and at 65° C. in 3 seconds. The exact nature of the reaction is not understood, especially as the resultant precipitate is evidently a mixture of sulphur and perhaps some sulphur compound of a mercaptan character, the odor being very characteristic. If the concentration of the two substances is changed, the resulting precipitate will vary in appearance. Under the conditions named the precipitate is yellow and changes to brown. If an excess of chloral hydrate is used, a pink precipitate is obtained. It seems possible that these reactions may be of value in the examination of chloral hydrate as to its purity, and in this direction the authors intend to make further studies.

Butylchloral (croton chloral) under the conditions of the test mentioned also produces a precipitate, which is of a beautiful lemon-yellow color; but the reaction is not so striking, and requires several seconds for the complete separation of the precipitate.—Chem. News, July 23, 1897, 41–42; from Amer. Chem. Journ. xix, No. 7, 1897.

Methyl Alcohol—Reaction with Magnesium Nitride.—From the chemical and structural analogy between water and methyl alcohol it was expected that the reaction of magnesium nitride (Mg_3N_2) upon methyl alcohol would result in the simple formation of magnesium hydroxide and trimethylamine; but Szarvasy finds the reaction not to be so simple, the products being ammonia, trimethylamine and magnesium hydroxymethylate. The latter, in contact with water, swells up and is decomposed, yielding methyl alcohol.—Pharm. Journ., July, 1897, 2; from Ber. d. d. Chem. Ges., 1897, 305.

Methyl Alcohol—Question of Toxicity.—Having in a previous paper recommended the use of methyl alcohol in certain pharmaceutical preparations, and incidentally discussed the question of its effects when taken internally, W. A. Puckner, in view of quotations and comments since made, now states his position on this question. After quoting different authorities, which leave the question of its possessing toxic action other than that of ethyl alcohol, to say the least, in doubt, Prof. Puckner describes experiments made upon his own person, which seem to prove conclusively that the effects of pure methyl alcohol, when it is taken internally, correspond to those produced by its homologue, ethyl alcohol. Nevertheless, it is is quite possible that impure wood-alcohol contains some toxic constituent, thus explaining the poisonous properties commonly ascribed to wood alcohol. In view of his investigations and experience, therefore, it seems probable that the effects of pure methyl alcohol, as well as the purified nearly acetone-free brands now sold, will in moderate doses correspond to those produced by ethyl alcohol in quality, and, if not less, will not exceed the same in quantity of degree. He does not favor or recommend, however, the introduction of methyl alcohol as a solvent or menstruum in pharmaceutical preparations, until extended experiments have shown the desirability of such an innovation.—West. Drugg., Dec., 1897, 555.

Methyl Alcohol—Comparison of Toxicity with other Alcohols.—Picard, experimenting with gold-fish on the relative toxicity of the alcohols, finds that this is directly as their molecular weights, and after a long series of experiments, concludes that the relative toxicity may be expressed by the following figures: Methylic alcohol, $\frac{2}{3}$; ethylic, 1: propylic, 2; butylic, 3; amylic, 10. These results are contrary to those of Dujardin-Beaumetz, in so far as he found methyl to be more poisonous than ethyl alcohol. —Pharm. Jour., Nov. 20, 1897, 446: from Comptes rendus, cxxiv., 829.

Wood Alcohol.—Experiments with a New Commercial Variety.—Willis G. Gregory reports upon some experiments made by him with a wood alcohol which has recently been introduced under the name of "Columbian Spirit," and recommended for a variety of pharmaceutical purposes. By its odor it could scarcely be distinguished from grain alcohol; its boiling point proved to be lower than that of ethyl alcohol, viz.: 65.4° C., as was also its sp. gr., which at 15.6° C., was found to be .805. Some crude experiments made to determine its heating qualities as compared with those of ethyl alcohol of sp. gr. .820, showed that 25 Cc. on combustion evolved the heat necessary to evaporate 33.5 Cc. of water, whilst the same quantity of ethyl alcohol evaporated 44 Cc. of water under the same conditions, these results being the average of five combustion experiments with each. The high price of the ethyl alcohol, however, leaves the advantage in favor of the methyl alcohol. Tincture of iodine, spirit of camphor, soap liniment, tincture of arnica, and Florida water, were made with the Columbian spirit, with the same proportion as ordinary alcohol would be employed, the products, so far as could be judged by physical examination, proving fully as satisfactory as those made with ethyl alcohol.—Proc. N. Y. State Pharm. Assoc., 1897, 245-246.

Columbian Spirit—Examination.—In response to a request of the Chairman of the Committee on Queries of the Kansas Pharmaceutical Association, L. E. Sayre contributes a paper in which he gives the results of the fractionation of a sample by his assistant, Mr. Edward Barton. The sp. gr. at 20° was 0.796, corresponding to that of pure methyl alcohol. From 200 Cc. he obtained at 61°, 63 Cc. of sp. gr. 0.790; at 70°, 40 Cc. of sp. gr. 0.791; at 80°, 46 Cc. of sp. gr. 0.792, and at 100°, 32 Cc. of sp. gr. (?) not given. The residue, amounting to about 10 Cc., gave an acid reaction. The original spirit by titration with sodium hydrate, using phenolphthalein as indicator, was found to contain 00.014 per cent. of acid calculated as acetic acid. By the method of Messinger, 00.13 per cent. of acetone was found

The manufacturers claim for "Columbian Spirit" that it is absolutely pure methyl alcohol, and that it is suitable for preparing all sorts of pharmaceutical preparations that are intended for external use, including perfumes, such as bay rum, Florida water, etc.—Proc. Kansas Pharm. Assoc., 1897, 23.

Formaldehyde—Preparation on a Commercial Scale.—In a paper read before the Philadelphia College of Pharmacy in March, Geo. L. Taylor, after considering the principles involved in the manufacture of formaldehyde from methyl alcohol, describes the apparatus which he himself designed for the manufacture of the solution on a commercial scale. The methyl alcohol to be converted is contained in a circular steel tank, capable of resisting heavy pressure; in the bottom of this tank is placed a coil of copper pipe into which steam at a high temperature is admitted; by this means the alcohol in the tank is boiled, and the resulting vapor is confined until a pressure of 75 to 80 pounds is reached, when it is allowed to escape into an air-mixer. This mixer is so constructed that an exactly determined quantity of air can be intimately combined with the methyl-alcohol vapors. From the mixer the combination of air and vapor passes with great force and velocity through a fine tube into the converter, which has been brought to a dull-red heat. This converter consists of two concentric copper tubes, the space between which is filled with broken coke or other material of a similar nature. The inner tube is finely perforated with many small holes. The alcohol vapor is admitted into this inner tube, and, escaping through the perforations, is oxidized by coming in contact with the heated coke and the copper surface of the outer tube. The gases so produced pass into the condenser, which consists of a cylindrical tank—which may be of copper; it contains a copper pipe, through which circulates a refrigerating mixture capable of reducing the temperature in the tank to about 0° C, at which temperature formic aldehyde condenses into a clear mobile liquid, which boils at 21° C., and which polymerizes to paraformaldehyde at 20° C. After a certain process of purification, enough water is added to the formaldehyde so obtained to form a

40 per cent. solution; but this solution is not, strictly speaking, a solution of formaldehyde, as the pure formaldehyde polymerizes the moment the temperature rises above 20°; and it is this property which renders the addition of water or alcohol necessary.

Paraformaldehyde, dried in the presence of sulphuric acid, becomes less soluble in water. The insoluble part constitutes

Trioxymethylene, a white powder resolving by heat into pure formic aldehyde. Hence

Formaldehyde Pastilles may be made by compressing this powder into the desired form and size, and these may then be used as an antiseptic and deodorant under suitable directions.

The author recommends Trillat's method for the detection of formaldehyde, which depends upon the cloudiness produced on mixing equal volumes of a solution of 3 Gm. of fuchsin or magenta in a liter of distilled water with the liquid to be tested. The method may also be applied quantitatively, a weighable precipitate being obtained under conditions given.—Amer. Jour. Pharm., April 1898, 195–201.

Formaldehyde – Quantitative Estimation.—Dr. E. J. Lederle suggests the following method for the estimation of formaldehyde in its solutions: Having taken the sp. gr., place 2 or 3 Cc., carefully measured, into a bottle with a glass stopper; add 50 to 60 Cc. $\frac{N}{2}$ ammonia solution; shake well, and let stand twelve hours, shaking occasionally. Then titrate with $\frac{N}{2}$ sulphuric acid, using coralline (rosolic acid) as an indicator. The number Cc. of ammonia consumed, minus the number of Cc. of sulphuric acid, multiplied by the factor 2.35, gives the percentage of formaldehyde in the sample. In case the solution under examination is acid, the amount is first to be determined by fixed alkali and a corresponding correction made in the calculation.—Amer. Drugg., Oct. 25, 1897, 246.

Formaldehyde—Color Reactions with Phenols.—H. Endemann calls attention to the color reactions produced by a number of phenols with formaldehyde under certain conditions. In order to produce the reaction the phenol is dissolved in commercial formaldehyde, or formalin, on the cover of a crucible. The solution is then evaporated, not quite to dryness, and concentrated sulphuric acid is added, when the following reactions may be observed:

	The Solid.	The Solution.
Phenol	Fuchsin-colored	Fuchsin-colored.
Salicylic acid	Red	Fuchsin.
Eugenol	Brown with shade of Bordeaux.	
Carvacrol	Orange to orange-red.	
Guaiacol	Violet, quickly brownish violet.	
Resorcin	Scarlet-red	Orange.
Hydroquinone	Brown	Brown.
Thymol	Faintly fawn-colored (due to impurity?).	
α-Naphthol	Green	Brown.
β-Naphthol	Green, then black	Green.
Pyrogallol	Red.	
Hematein	Red, then brown.	
Tannin	No reaction.	

This reaction is not confined to formaldehyde, but is likewise produced by other aldehydes. The colors, however, differ; for instance, phenol and benzaldehyde give brown solid and brownish-yellow solution.—Bull. Pharm., Aug, 1897, 365; from Proc. Soc. Chem. Ind.

Formaldehyde—Industrial Application.—C. S. Dolley, under a recent patent, employs formaldehyde in the preparation of leather. Hides or skins prepared in the usual way for tanning, are subjected to the action of formaldehyde of a strength gradually increasing from 3 to 10 per cent. About one hour treatment completes the process.—Amer. Journ. Pharm., Dec. 1897, 652.

Formaldehyde—Efficiency as a Preservative for Pharmaceutical Preparations.—George Roe in a lengthy paper briefly reviews the history of formaldehyde, characters, uses, etc., and records the results of his experiments and experience with it as a preservative for various solutions and mixtures of organic substances in water, such as almond mixture, infusions and decoctions, hypodermic solutions, milk, etc. He finds it to be generally efficient when added in the proportion of 1 : 1000 to 1 : 3000, in some cases even 1 : 10,000, using for such addition a 1 per cent. solution made by diluting 2½ parts of a pure 40 per cent. solution with 97½ parts of distilled water. In the lesser dilutions he believes it might with impunity be used for any purpose of internal exhibition, but he is in doubt about the dilution of 1 : 1000, which might with advantage be used in the more concentrated preparations that are subsequently to be again diluted.—Pharm. Journ., Feb. 26, 1898, 215–217.

Paraformic Aldehyde—Convenient Use as an Antiseptic.—Dr. B. H. Paul and A. J. Cownley record some experiments made to ascertain whether the solid polymeric modification of formaldehyde, known as paraformaldehyde, could be employed for extemporizing a solution of formic aldehyde suitable for antiseptic purposes. The results show that is possible to readily convert insoluble paraformaldehyde into its soluble modification, formaldehyde, and it would seem therefore that it would be more advantageous to produce paraformaldehyde than formaldehyde for commercial use, as it is more readily manipulated and easily rendered soluble to a suitable degree of strength when required. Furthermore, where an antiseptic powder is required there is no reason why paraformaldehyde itself should not be of great service. The author found that when paraformaldehyde is boiled with water in the proportion of 4 : 10 in a flask connected with an inverted condenser until solution was effected, the conversion into the soluble formaldehyde was effected in about two hours. A parallel experiment made in sealed tubes heated to the temperature of boiling water, showed no advantage; indeed, the conversion in the open flask seems to be the more rapid. Concerning the formation of paraformaldehyde from formic aldehyde, the author observes that the character of the resultant product depends on the method of procedure, as well as on the purity of the material operated upon. On exposure to air of any aqueous solution of formic aldehyde until it dries up, there appears to be found not the true para compound, but a mixture partaking to some extent of the character of the substance $(CH_2O)_2$, described by Tollens and Mayer as being formed when formic aldehyde is evaporated over sulphuric acid. This substance was found to melt at about 131° C., and was more soluble in water than paraformaldehyde. The polymer $(C_3H_6O_3)$ produced by adding sulphuric acid to formic aldehyde had a much higher melting point, namely, 170° C., and the variation of the melting point from 152° to 172° C., ascribed to paraformaldehyde, is no doubt due to an admixture of these two bodies. A commercial sample of paraformaldehyde was found to have a melting point of from 162° to 163° C.—Pharm. Jour., Aug. 7, 1897, 101.

Formaldehyde—A New Class of Antiseptic Compounds.—H. Opperman has found that by the agency of ammonia, formaldehyde may be combined with any substance capable of combining with or dissolving in ammonia solution. In this way crystalline compounds may be produced—similar to the compounds of the aldehydes with bisulphites—in which formaldehyde is united with substances having disinfecting, preserving or specifically therapeutic properties. For the preparation of these bodies, the ordinary 40 per cent. solution of formaldehyde, together with the required substances—tartrates, boric and salicyclic acid, phenol, etc.—is dissolved in the requisite amount of ammonia solution of 30 per cent. strength, with constant stirring and cooling. The compound either crystallizes out or is obtained by evaporation in ovens. That obtained with boric acid in this way is said to be more efficacious than mercuric chloride, while the phenol compound will disinfect a large space when evaporated in small quantity.—Merck's Report, Feb. 1, 1898, 77; from Jour. Soc. Chem., Ind., xvi., 931.

Trithioformaldehyde—Formation from Lead Formate.—Auger, when preparing anhydrous formic acid by the action of hydrogen sulphide upon lead formate, obtained as a by-product a crystalline body, melting at 216° C., which he recognized to be trithioformaldehyde. Its formation is explained by the formation of formaldehyde during the dry distillation of the lead formate, which then forms the trithioformaldehyde (trithiomethanal) with the hydrogen sulphide introduced.—Pharm. Centralh., March 17, 1898, 193; from Chem. Ztg., 1898, 160.

Anesin—A New Synthetic Hypnotic and Anæsthetic.—Kossa, Vamorsy, and others, have investigated the physiological action of a new synthetic compound, lately introduced by a Swiss manufacturing firm, which is described as being an aqueous solution of tertiary trichlorbutyl alcohol, and as being equal in its action to a 2 per cent. solution of cocaine. Its physiological action was found to resemble that of chloral hydrate, the hypnotic dose being from 7 to 16 grains, while, according to Professors Laufenauer and Kétly, sixteen grains and upwards can be administered without any unpleasant symptoms being produced.—Pharm. Journ. Oct. 2, 1897, 297; from Apoth. Ztg. xii., 608.

Parachlorophenol—Disinfectant Value.—Dentu reviews the statements of Girard with regard to the toxity and antiseptic properties of parachlorophenol. He finds that while it is more toxic than stated by Girard, it is less so than phenol, over which it possesses the advantage of four times greater microbicidal power, of having a less powerful and persistent odor, and of being less irritating in its effects. Under certain conditions it is, therefore, to be preferred to phenol, though its employment requires careful watching.—Pharm. Journ. Jan. 15, 1898, 61; from L'Union Pharm., xxviii., 449.

Silver Sulphophenylate—A New Antiseptic.—Zanardi has prepared a new silver salt—the sulphophenylate—by the action of phenylsulphonic acid on silver carbonate. The salt, which is sensitive to light, is proposed as an antiseptic.—Pharm. Ztg., 1897, 597; from Boll. Chim. Farm., 1897, 449.

Fluorophenetol and Difluorodiphenyl—Medicinal Application.—It is stated in "Pharm. Ztg." (xlii., 546), that a mixture of fluorophenetol and difluorodiphenyl in the form of an ointment has been introduced, under the name of

Antirheumatine, as a remedy for rheumatism and influenza, while under the name of

Antitussine an ointment of difluorodiphenyl has been recommended as a remedy in pertussis. The latter is stated to exercise a sedative and hypnotic action when applied.—Pharm. Journ., Oct. 2, 1897, 297.

Lactophenin—Advantage over Phenacetin.—Dr. George Thompson points out several advantages possessed by lactophenin over phenacetin. Differing from phenacetin by containing lactic instead of acetic acid, this substitution of lactic acid, it is claimed, overcomes almost entirely the possibility of cardiac depression or the conversion of hæmoglobin into methæmoglobin, an attribute only too frequently met with in antipyrine acetanilid and phenacetin. As an analgesic it is equal, according to the author, to the best pain-reliever in the materia medica, and it may be given with confidence in neuralgia from any other cause than traumatic.—Amer. Journ. Pharm., Oct. 1897, 546; from Univ. Med. Journ., Aug. 1897.

Pure Guaiacol—Process of Preparation from Ortho-Anisidine.—The following patented process for obtaining pure guaiacol, free from homologues and other phenols, is described in the "Pharm. Centralh." (1898, 89): Ortho-anisidine is diazotized and the diazo-anisol is decomposed by boiling with sulphuric acid of at least 35 per cent., at temperatures above 135° C. The guaiacol so formed is immediately distilled off by passing a current of steam through the solution. It is then redistilled at about 200° C., and congeals at once to crystals which melt at 30° C.

Phospho-Guaiacol—A New and Definite Compound.—By the reaction of phosphorus trichloride upon guaiacol in alkaline solution, Bailard has obtained phospho-guaiacol, a new and definite compound. It is a colorless, crystalline powder, soluble in water, readily soluble in alcohol, ether, and benzene, and contains 7.75 per cent. of phosphorus. It is not caustic, and is tolerated in doses of 6 to 8 Gm. The corresponding compound obtained from creosote is named by the author

Phosphatol.—This is a thick, reddish-brown liquid.—Pharm. Jour., July 3, 1897, 5; from Répert de Phar., 1897.

Brenzcain—A New Substitute for Guaiacol.—In "E. Merck's Bericht," 1898, attention is called to guaiacolbenzyl ether, which under the name of "brenzcain" is introduced as a substitute for guaiacol. It forms colorless crystals, melting at 62° C. and is soluble in alcohol and ether. It is claimed to be free from the caustic action that guaiacol exerts on mucous membranes, as well as from other drawbacks, while possessing all its advantages. It dissolves best in vasogen, and in such solutions it may be exhibited like the other guaiacol compounds, and in similar doses.—Merck's Rep., March 1, 1898, 139.

Guaethol—A New Derivative of Guaiacol.—Attention is called in "Therap. Woch." (iv., 745) to a derivative of guaiacol, guaethol, in which the methyl group is replaced by an ethyl radicle, its composition being $C_6H_4.OH.OC_2H_5$. It forms an oily liquid, crystallizing at low temperatures, insoluble in water and in glycerin, and dissolved by alcohol, chloroform, and ether. Its analgesic action is stated to be more marked than that of guaiacol. It is used for allaying pain by direct application, or as an ointment of 1 part of guaethol to 6 of vaseline, or as a 10 per cent. emulsion in glycerin. Given internally it possesses no advantages over guaiacol.

Ajacol and Guaethol—Chemical Identity.—Dr. Partheil directs attention to the fact that pyro-catechin-mono-ethyl-ether is put on the market under two different names for medicinal use. Merck has given the name of guaethol to this compound, while Von Heyden has given to it the name of ajacol. The author states that ajacol distinguishes itself by the ease with it can be crystallized, while guaethol is much less readily crystallizable. The ethyl compound differs from guaiacol in its lower specific gravity and decreased solubility in water, one part of guaiacol requiring 50 parts of water for solution, while one part of ajacol requires from 100 to 105 parts of water.—Amer. Drugg., Oct. 25, 1897, 245; from Proc. Soc. Germ. Nat. and Phys., Sept., 1897.

Gaïacyl—Preparation and Anæthesic Value.—C. André describes gaïacyl as being the calcium derivative of gaïacyl-sulphurous acid, $(C_7H_7O_2,SO_3)Ca$. To obtain it, he placed 100 Gm. of pure guaiacol in a matrass, and gently heated it; when liquid, he added very gradually 100 Gm. of pure concentrated sulphuric acid, and left it at the ordinary temperature for 48 hours. It was then diluted with six or seven times its weight of distilled water, and saturated with carbonate of lime in small pieces, at 80° C. on the water-bath; it was then filtered and evaporated to dryness, and taken up in four or five times its weight of alcohol at 90° C.; this separates out a small quantity of insoluble substances. After re-evaporation and pulverization, a greyish mauve powder is left, very soluble in water and alcohol, but not in oil; this is gaïacyl. In collaboration with Dr. O'Folloinel, the effect of gaïacyl as a local anaesthetic, to replace guaiacol in subcutaneous injection, was tried. In $\frac{1}{10}$th to $\frac{1}{20}$th solutions in water gaïacyl gave practically the same results. In extracting teeth, out of thirty-two cases, in twenty-two the anæsthesia was sufficient, in seven it was incomplete, and twice there was no effect—one case was doubtful. Out of eleven small surgical operations, in five the anæsthesia was complete, five times it was sufficient, and once it failed; that is to say, 90 per cent of success.—Chem. News, June 17, 1898, 286; from Journ. de Pharm. et de Chimie, Series 6, vol. vii., No. 7.

Creosote—Preservation by Exposure to Direct Sun-Light.—A writer in "Pharm. Post" (1897, 304) states that when creosote is kept in glass-stoppered bottles exposed to the direct sunlight, it loses any color it may have had, and becomes perfectly colorless.

Kreosolid—A Magnesium Compound of the Creosote Phenols.—Under the name of "kreosolid," Denzel has introduced a magnesium compound of the divalent phenols of creosote. It is a white powder, having only a slight odor and taste, and, having no caustic action, can be taken without discomfort, the dose being 0.5 Gm. four times a day. The acids in the stomach decompose it, liberating guaiacol and creosol in a minute state of division.—Pharm. Journ., July 3, 1897, 5; from Therapeut. Monatsh., 1897, 292.

Sylvane—Occurrence in Beech Tar Creosote.—About seventeen years ago Atterberg isolated from the tar oil of *pinus sylvestris* a substance, C_5H_6O, which he recognized as methyl furane and which he named sylvane, while E. Fischer and Laycock subsequently stated that dimethyl furane and higher methylated furanes occurred in the low boiling portions of wood tar. C. Harries now finds a substance in the fraction 60°–70° of beech tar creosote which he demonstrates to be identical with the methyl furane of Atterberg. The fraction below 70° of beech tar oil—150 ko. tar yield about 10 ko.—is skaken with sodium acid sulphite solution to remove aldehydes and ketones (about 10—12 ko. of a 40 p. c. solution are necessary). To remove acids, the remaining oil is skaken with about 10 ko. of a 10 p. c. soda solution, and the oil dried with potassium carbonate and carefully fractionated with a column. Fraction 60–70° (about 2.4 ko.) is heated with sodium on a water-bath, 500 g. of oil requiring about 50 g. of sodium. The oil is again fractionated, when the principal fraction boils at about 65° under 759 mm. pressure. It has a sp. gr. of 0.827 at 18° C., is a colorless, limpid liquid of an agreeable ethereal odor, but turns yellow upon standing a day. A pine shaving moistened with concentrated hydrochloric acid is colored emerald-green by it. Upon hydrolysis with methyl alcoholic hydrochloric acid it yields leontine methylal—$CH_3.CO.CH_2CH_2CH(OCH_3)_2+H_2O$. With very dilute hydrochloric acid this dimethyl ether is readily hydrolized to the keto aldehyde, pentanonal or levulinic aldehyde. This was oxidized to the corresponding acid. With ammonia and phenylhydrazine unstable addition and substitution products are produced which upon standing rearrange themselves into dihydropyridazine derivatives.—Pharm. Review, March 1898, 110; from Berichte, *31*, 37.

Gossypol—An Acid Phenol from Cotton Seed.—L. Marchewski has isolated from cotton seeds a new crystallized compound, which he names "gossypol." It possesses the character of a phenol and of an acid at the same time, but in the absence of characteristic derivatives, its constitution and formula have not yet been established. Judging from the chemical and physical behavior of some of its compounds, the new substance appears to be nearly related to certain tannins.—Pharm. Centralh., Feb. 17, 1898, 108; from Chem. Zeit., 1898, 11.

Resorcin—Pulverization by the Aid of Ether.—Speaking of some difficulties encountered in dispensing a paste composed of zinc oxide, starch and resorcin, Schmatolla observes that it will not do to dissolve the resorcin in water, as would be admissible in making simple resorcin ointments, for instance. But in the combination mentioned, the water would be rapidly absorbed by the starch, which then separates and forms a granular mass. The resorcin must, therefore, be incorporated dry, and for this purpose it must be reduced to an impalpable powder. The most convenient way to accomplish this is to triturate the crystals with a little ether, after the manner of powdering camphor. The trituration must be continued until the powder produced is perfectly dry, so as to avoid, as far as possible, the odor of ether.—Phar. Ztg., Sept. 22, 1897, 650.

Glycerin—A New Synthesis.—Oscar Piloty has now succeeded in preparing *dihydroxyacetone*, $CH_2(OH).CO.CH_2(OH)$, in a pure condition. This, the simplest member of the group of the ketoses, of which ordinary levulose or fruit sugar is the best-known representative, has long eluded the attempts of chemists to isolate it in a pure state, although mixtures in which it is undoubtedly present have been obtained by several investigators by the oxidation of glycerin. Piloty employs as the starting point for its preparation the oxime, $CH_2(OH).C:NOH.CH_2(OH)$, which can easily be obtained from the product of the action of formaldehyde on nitromethane, both substances of very simple constitution. When this oxime is treated with bromine, nitrous oxide is evolved and dihydroxyacetone produced.

It crystallizes well, and has a sweet and cooling taste. In other respects it also shows the well-known characteristics of the sugars, reducing Fehling's solution almost as powerfully as grape sugar, and yielding an osazone with phenylhydrazine. On reduction it is converted into glycerin, a new synthesis of this important compound being thus effected. The production of dihydroxyacetone from formaldehyde is of great interest in view of the important function which the latter is supposed by many to perform in the natural production of sugars in the vegetable organism.—Chem. & Drugg., Jan., 29, 1898, 164.

Glycerin — Suggestions Concerning Pharmacopœial Requirements.—Walter S. Kirk, in compliance to a request of Prof. C. S. N. Hallberg, communicates some information concerning the pharmacopœial tests for glycerin, which, while good as far as they go, are misleading in some cases. Thus he knows chemically pure glycerin to have been condemned by the silver nitrate test and again because it sometimes does not answer the sulphuric acid test. In the former case the silver nitrate had oxidized by exposure to light or air, while in the latter test much depends on the manner in which the test is carried out; if a sample of chemically pure glycerin is simply stirred with the acid with a glass rod, the test will show a light straw color, while the same glycerin will show a dark-brown color if the two are shaken together in a test tube. The direction to gently warm the mixture is an error, since the heat naturally generated is so great that more would cause combustion. His firm have found no difficulty to make a glycerin containing 99.5 per cent. pure glycerin, with .431 per cent. water, .005 per cent. NaCl, .004 per cent. fatty acids, and such a glycerin can be produced by manufacturers at an only slightly increased cost. The Pharmacopœia should, therefore, continue to insist that glycerin be of sp. gr. not less than 1.2637 to 1.2640 at 15° C., with impurities not exceeding in character or quantity those named.—Proc. Ills. Pharm. Assoc., 1897, 89–90.

Glycerin—Sulphuric Acid Test for Carbonizable Impurities.—Ferd. A. Sieker calls attention to the confusion that is likely to arise from the demand of the U. S. P., 1890, that "on gently warming a mixture of equal volumes of glycerin and of concentrated sulphuric acid in a test tube the liquid should not acquire a dark color (absence of readily carbonizable impurities)." Warming is regarded as heating moderately, about 40° C., while a *gentle* heat is defined by the U. S. P., 1890 (p. xliii) as being any temperature between 32° and 38° C. On mixing about 1 Cc. or less of each pure glycerin and sulphuric acid, the temperature will rise high, because the heat is absorbed by the container, and therefore the application of a moderate heat may be permissible. The author has, however, observed that on mixing 5 Cc. of each of the liquids (at 20° C.) the temperature rose spontaneously to about 75° C., while if 7 Cc. of each were mixed together the temperatare rose to 90° C. The color of the mixture, with pure material, was yellowish, but not dark colored. It follows that when using 5 Cc. or more of each, considerably more than a gentle heat is developed, and that more heat is therefore neither necessary nor desirable. —Pharm. Review, Jan., 1898, 14.

Glycerin—Examination of Commercial Samples.—J. M. Good has contributed a practical paper on glycerin and its examination, and gives the results of an examination by the official (U. S. P.) tests of six commercial samples in a table, as follows:

	Reaction.	Carbonizable Impurities.	Fatty Acids.	Metals.	Sulphuric Acid.	Oxalic Acid.	Calcium Salts.	Sugars.	Chlorides, etc.
No. 1.	Slightly acid.	Each sample showed a slight brown tinge.	A perceptible odor from each; in no case offensive.	None.	None.	None.	None.	None.	None.
No. 2.	Neutral.			None.	None.	None.	None.	None.	Slightly darkened in color.
No. 3.	Slightly acid.			None.	None.	None.	None.	None.	Slight opalescence.
No. 4.	Neutral.			None.	None.	None.	None.	None.	Slight opalescence.
No. 5.	Slightly acid.			None.	None.	None.	None.	None.	Dark color positive.
No. 6.	Neutral.			None.	None.	None.	None.	None.	None.

Sample No. 6 was the only one which gave negative results to all tests. It requires but a short time to render this statement. The careful application of the tests for determining the chemical purity of glycerin as directed in the Pharmacopœia requires a great deal of time. The busy pharmacist is not likely to use all the tests. There are certain ones however, which he should apply to each new lot of glycerin which he purchases. They are:

Determining specific gravity.

Heating with diluted sulphuric acid to detect by the odor the presence of fatty acids.

Adding the test solution of silver nitrate.—Proc. Mo. Pharm. Assoc., 1897, 75.

Glycerin—Detection in Syrups.—Deniges detects the presence of glycerin in syrupy liquids by the production of acrolein when a small quantity of the liquid is heated with three or four times its weight of powdered potassium bisulphate. Any acrolein vapor which may have been formed is detected by Nessler's reagent, or by passing the vapor into a hot mixture of equal parts solution of ammonia, of a 2 per cent. solution of silver nitrate, and of solution of soda, when the presence of glycerin is indicated in the syrup by the reduction of the silver solution.—Pharm. Centralh.

Glyceric Ether—Production and Properties.—According to Stoehr, glyceric ether, $C_6H_{10}O_3$, may be obtained by distilling glycerin with phosphoric acid, and results from the condensation of two molecules of the alcohol. It crystallizes from ether in shining tablets or in prisms, which melt at 124° to 125° C., and boil at 209° C. without decomposition. It forms a crystalline compound with mercuric chloride, and this serves for its removal from its aqueous solutions.—Pharm. Centralh., July 8, 1897, 441.

Glycerophosphoric Acid—Difficulty to Prepare in a State of Purity.——Adrian and Trillat have endeavored to prepare phosphoglyceric acid by Pelouze's method, and they obtained a product which on analysis partly corresponded to the acid phosphoglycerate of baryta. They also tried to decompose phosphoglycerate of potash by tartaric acid, as well as by other methods, but the result of their observation tends to show that there is not yet any known method of preparing phosphoglyceric acid in a state of purity; that this acid is decomposed by heat, and even by simple concentration, forming phosphoric acid; that the reaction of phosphoric acid on glycerin is complex, though limited; that there exists in conjunction with phosphoglyceric acid at least one diether, neutral to indicators, formed of one molecule of acid for two of glycerin, very slowly decomposable in the cold by the alkali carbonates.—Chem. News, May 20, 1898, 237; from Journ. de Pharm. et Chim., 1898, No. 5.

Glycerophosphates—Method of Assay.—A. Astrue recommends the following method for the assay of glycerophosphates, which is based upon the observation that calcium glycerophosphates in solution are alkaline to methyl orange, and that they may be either acid or alkaline to phenolphthalein. To determine the amount of phosphoric acid present, he neutralizes a known volume of glycerophosphate solution with sulphuric or hydrochloric acid, with methyl orange as indicator, then titrates the solution with standard alkali and phenolphthalein. In the equation representing the first reaction, one molecule of mineral acid corresponds to two molecules of phosphoric acid; and in the second, one molecule of phosphoric anhydride corresponds to two molecules of soda. The quantity of phosphorus pentoxide in solution can thus be calculated, the results obtained being about 0.5 per cent. lower than those obtained by calcining a known weight of glycerophosphate, dissolving the ash in hydrochloric acid, and determining the phosphorus as magnesium pyrophosphate. The author concludes that the phosphoric acid in glycerophosphates can be determined very closely and rapidly by the method he describes; that the calcium glycerophosphates appear to decompose, even during their preparation; and that undecomposed calcium glycerophosphate seems to require a quantity of acid equivalent to that of the soda necessary to act on phenolphthalein in order to react on the methyl-orange.—Pharm. Journ., Feb. 19, 1898, 163; Journ. Pharm. Chim. [7], vii., 5.

Acid Glycerophosphates—Advantages over the Neutral Salts.—Adrian and Trillat, in continuation of their studies of the phosphoglycerates, describe the acid phosphoglycerates. These can be prepared by decomposing the corresponding neutral salts by the theoretical amount of sulphuric acid, in the presence of helianthin as an indicator, or by the double decomposition between the acid salt of barium and a soluble sulphate. The acid phosphoglycerates are distinguished from the neutral salts by their great solubility in water. They are difficultly precipitable from their solutions by alcohol, which even at 50° dissolve a considerable proportion. They do not crystallize, and when dried *in vacuo* they appear in the form of a white vitreous mass (blue in the case of the copper salt), unchangeable at 100° C. On the other hand their aqueous solutions are decomposed on boiling, forming free phosphoric acid and glycerin.—Chem. News, June 17, 1898, 285; from Compt. rend., April 25, 1898.

Calcium Glycerophosphate — Commercial Quality.—Adrian and Trillat have examined a number of commercial samples of calcium glycerophosphate, and have found that it varies very much in physical and chemical characters, and is, as at present supplied, far from being a definite compound. Seven samples examined contained from 19.5 to 24.5 per cent. of lime, and from 26 to 33 per cent. of phosphoric acid. In six of these, two were neutral to litmus, one alkaline, and three acid. The solubility of the acid samples in distilled water at 25° C. was markedly in excess of the others, the most soluble dissolving to the extent of 7.6 in 100, while of the neutral sample only 4.05 in 100 was dissolved. The residues left by this treatment differed widely in composition, being composed chiefly of phosphate of lime, with some sulphate; the latter being probably derived from washing the precipitate with calcareous water. On extracting different samples with boiling alcohol and distilling off the solvent, residues varying in amount from 1.8 to 4.2 per cent. were obtained. These were found to consist of glycerine and free phosphoric acid, the percentage of the former varying from 3.4 to 1.3 and of the latter from 1.5 to *nil.*—Pharm. Journ., Jan. 8, 1898, 24; from Journ. de Pharm. et Chim. (6) vi., 435.

Calcium Glycerophosphate—Preparation of a Pure Salt.—In continuation of their experiments on the glycerophosphates, Adrian and Trillat propose the following method for preparing the pure calcium glycerophosphate: Equal parts of glycerin and phosphoric acid are gradually heated on a sand-bath in an enameled vessel to between 130° and 150° C., and maintained at that temperature for 24 hours, when the dark-colored viscid mass begins to evolve acrid fumes. Instead of calcium carbonate, the authors use tribasic calcium phosphate to combine the free phosphoric acid, since effervescence is thus avoided. The free phosphoric acid forms with this dibasic calcium phosphate; milk of lime is then added in excess, which combines with the glycerophosphoric acid and again precipitates the phosphoric acid as tribasic calcium phosphate, which is filtered out and again used in subsequent operations. The filtrate is concentrated to a pasty consistence, then poured into 10 parts of alcohol, and boiled for an hour. After draining, it is again treated with alcohol and precipitated by heating, collected, and dried on the water-bath. The authors have obtained the salt in the form of a microcrystalline powder by precipitating the aqueous solution by boiling, when it forms minute, well-formed needles. These, however, at once lose their crystalline form on exposure to the air, and disintegrate even on the microscope slide while under observation. Analysis gave figures corresponding to the anhydrous salt of Telome. The solubility of the one salt in water at 25° C. was found to be 4.53 in 100.—Pharm. Journ., Jan. 29, 1898, 88, 89; from Journ. de Pharm. et de Chim., 1897 (6), vi., 481.

Glycerophosphates—Use as Injection for Sciatica.—Dr. Robin finds that excellent results are obtained by the deep injection, in cases of sciatica, of a solution of glycerophosphates into the painful part. The most useful solution is that of the sodium salt 1 : 4. Another solution contains 0.04, each of the glycerophosphates of lime, magnesia and potassium, and 0.13 of the sodium salt in a cubic centimeter. In a third solution, 0.05 of the sodium salt is replaced by 0.05 of the iron salt. The dose of each of the solutions is 1 to 4 Cc.—Pharm. Journ., Aug. 7, 1897, 118; from Bull. Gén. de Thérap., cxxxii., 433.

FIXED OILS.

Fixed Oils—Additional Compounds with Sulphur.—Referring to the variable character and composition of the so-called "balsam of sulphur," Dr. Julius Altschul finds that the property of taking up and combining with large quantities of sulphur is shared by the oils of the unsaturated hydrocarbon series, while saturated fats—such as stearic acid, for instance—take up sulphur with difficulty only, and part with it again when subjected to the action of solvents, such as ether, oil of turpentine, etc. Unsaturated fats, on the other hand, take up large and definite quantities of sulphur, forming *true addition products from which the sulphur cannot* again be separated by the simple action of solvents. By heating unsaturated oleic acid with 12.5 per cent. of sulphur at 140° C. for several hours, a clear solution is obtained, from which solvents will extract only 0.08 per cent. of sulphur, while the compound retains 11.2 per cent. The theoretical percentage in a compound of the composition $C_{18}H_{34}SO_2$ would be 11.35 per cent. sulphur. By suitable manipulation, similar definite compounds of sulphur can be obtained with liquid fats—such as linseed, rape, olive, cotton, cod-liver, and poppy oils, all of which contain unsaturated compounds. These sulphur compounds are saponifiable, forming, by treatment with alcoholic potash, sulphur soaps, which Dr. Altschul has called

Thiosapoles.—But Dr. James Robie Wood finds that the combinations of these sulphur additon-compounds with alkalies are often irritating and even dangerous to administer, and he therefore suggested to F. M. Hill the preparation of a solution of pure sulphur alone. Mr. Hill supplied an elegant solution in glycerin alone, and has since succeeded in producing most perfect solutions, *directly* and *indirectly*, of pure sulphur without alkaline or other combinations, in various menstrua; among them, besides glycerin, albolene, vaselin, stearin, margarin, olein, paraffin oil, lanolin, olive oil, kerosene, naphtha, etc. Dr. Wood expresses the belief that these new compounds will not only prove valuable substitutes for *ichthyol* in the treatment of disease, but will often surpass it in activity.—N. Y. Medical Journ., Oct., 1897.

Fixed Oils—Estimation of the Degree of Oxidation.—In 1856 Chevreul had found in the course of experiments that linseed oil mixed with manganese absorbed ten times more oxygen than the pure oil itself. W. Bishop has now experimented in the same direction, but he uses as drying agent a kind of soap made by mixing oxide of manganese with resin. He dissolves this resinate in the oil to be tested in the proportion of 0.2 Gm. of the former to 10 Gm. of the oil. Then, to facilitate the access of air, he adds 1 Gm. of a light silicate, obtained by precipitation and calcination. The desiccation is then allowed to proceed. The table of the order of oxidation confirms what has already been shown by M. Livache with regard to this order. Mr. Bishop obtained for linseed oil an absorptive value of oxygen of 14 per cent. in twenty-four hours. He has successfully applied his method to the comparison of different commercial oils and the recognition of possible mixtures which could be made.—Chem. News, July 9, 1897, 24; from Bull. Soc. d'Encouragement, pour l'Ind. Nort. (5) ii, No. 5, 1897.

Oil—Function in Leaves.—S. Rywosch has made a series of observations on the oil contained in the leaves or other green organs of a number of plants, and finds its function is entirely different from that of the oil contained in the stem of woody plants. Instead of being stored up in the winter and disappearing when the period of vegetative activity recommences, it remains and even increases in amount during the spring and summer, being very large even when the leaves have turned yellow in the autumn. It cannot, therefore, be regarded as a reserve food-material; its purpose appears to be to take up the xanthophyll. The author was unable to determine the chemical nature of these oils, whether they belong to the fatty or to the essential series.—Pharm. Journ., Oct. 2, 1897, 298; from Berichte der Deutschen Botanischen Gesellschaft, 1897, p. 195.

Sweet Almond Oil—Substitution by Cotton Seed Oil.—L. A. Harding reports upon a sample of very cheap sweet almond oil, offered in the Minnesota market, which responded to none of the tests of identification of that oil, but did respond to all the tests for cotton-seed oil that were applied to it. The sample was evidently cotton-seed oil, pure and simple, though of very good quality.—Proc. Minn. Pharm. Assoc., 1897, 53.

Oil of Black Walnuts—Yield and Characters.—Barthe and Boutineau state that the tree producing black walnut, *juglans nigra*, L., was imported into Europe in 1656, and is now common in the Gironde and Lower Pyrenees, where it grows to a considerable size. Although its nuts are not as agreeable to the taste as the ordinary walnut, it gives a useful quickly drying oil, which the authors have prepared and examined. One kilogram of the kernel gives, as a rule, 470 Gm. of oil; its specific gravity is 0.929 at 15° C.; its acid index, expressed in mgms. of caustic potash, is 4.12; its index of saponification is 195; its index of refraction is +26° at 15° C. in Jean's refractometer; it dissolves in absolute alcohol to the extent of 6 Gm. per litre.—Chem. News, Sept. 17, 1897, 145; from Bull. Soc. de Pharm. de Bordeaux, July, 1897.

Sesame Oil—Test for its Presence in Olive Oil.—The experiments of A. J. F. de Silva confirm the statement of E. Millian that the test of Baudoin and De Latil for the presence of sesame oil in olive oil is not trustworthy, as a similar reaction—the production of a rose coloration when the oil is treated with hydrochloric acid and sugar—may be obtained with olive oils that are known to be pure. If, however, pyrogallol be substituted for the sugar, as in Toches' reagent, more satisfactory results are obtained, whether the oil itself be operated upon or the separated fatty acids. The reagent consists of 2 Gm. of pyrogallol and 30 Gm. of hydrochloric acid. Equal weights of this mixture and the oil to be examined are shaken together, and after being allowed to stand awhile the acid layer is separated and heated for five minutes. If sesame oil be present, a reddish-purple color appears.—Pharm. Journ., Feb. 12, 1898, 139; from Bull. de la Soc. Chim., xix., 88.

Cotton-Seed Oil—Characteristic Reaction.—G. Halphen finds that the red color which he noticed some time ago when a sulpho-carbonic solution of the zinc salts of the fatty acids of cotton-seed oil was evaporated down to dryness is not due to the oxide of zinc at all, but that the sulphide of carbon alone will bring about the reaction, though only after a long time—so long in fact that it cannot be usefully applied to analysis. In trying to hasten the reaction, it was found that if both the oil and the sulphide were dissolved in amylic alcohol, the phenomenon was considerably accelerated. The best method of procedure is to mix in a test-tube equal parts of the oil to be tested, amylic alcohol, and sulphide of carbon containing 1 per cent. of sulphur in solution. This tube is plunged into boiling salt water, so that one-half or two-thirds is above the surface; after ten minutes or a quarter of an hour the coloration appears if cotton-seed oil is present.—Chem. News, Jan. 7, 1898, 11; from Journ. de Pharm. et Chim., No. 9, 1897, 463.

Cotton Seed Oil—Modification of Bechi's Test for its Presence in other Oils.—M. Tortelli and R. Ruggeri describe the following modification of

Bechi's test by which they claim to be able to detect the addition of 1 per cent. of cotton seed oil to olive or other vegetable oils: Five Gm. of the oil are saponified by boiling with alcoholic potash solution, and the alkaline soap solution neutralized with acetic acid. This is then poured in a thin stream, when boiling, with constant agitation, into a warm mixture of 50 Cc. of 10 per cent. lead acetate solution and 250 Cc. of water. The lead soap thus obtained is washed with three successive portions of water of 60 to 70° C., cooled, well drained, then gently boiled in 120 Cc. of ether under a reflux condenser for twenty minutes. After cooling, the ethereal solution is decanted, filtered, and washed twice with 60 Cc. of 10 per cent. HCl and once with more dilute acid, and then with water, the acid washings containing lead chloride being rejected. The ethereal solution is filtered into a small flask and the solvent distilled off. The flask is then washed out with a reagent consisting of 10 Cc. of 90 per cent. alcohol and 1 Cc. of 5 per cent. silver nitrate solution. The mixture is transferred to a test tube, which is plunged into a water bath heated between 70° and 80° C. If the original oil be pure the liquid remains unaltered for fifteen minutes or even for hours. If cotton-seed oil be present, however, even in as small a quantity as 1 per cent., the liquid quickly shows signs of reduction, which becomes more intense in time.—Pharm. Journ., May 28, 1898, 505; from L'Industria, through Union Pharm.

Expressed Oil of Nutmeg (Oil of Mace)—Preparation in Europe.—According to Warburg, the expressed oil of nutmeg, also known as "nutmeg butter" and "oil of mace," is not prepared on the Moluccas, the principal source of nutmegs, but almost exclusively in Europe. The European product comes into the market from Holland in form of cubes, wrapped in paper, and weighing about 1½ pounds. In Germany, it is said to be obtained by extraction and not by pressure. Nutmeg butter is subject to many adulterations, a customary one being the fat of Myristica argentea. It contains much ethereal oil, which may also be obtained from the press cakes in quantities of 8 to 10 per cent. According to Koller, this oil is indistinguishable from oil of mace, and in Germany is placed on the market almost entirely as oil of mace.—Pharm. Era., Feb. 24, 1898, 291.

Piquia Oil—A Substitute for Cod-Liver Oil and Butter.—Thomas H. Wardleworth calls attention to "piquia oil," which is obtained at Maranham from the nuts of a tree indigenous to Guinea and Brazil, probably *Caryocar braziliense.* The oil is a concrete yellow substance, retaining the fresh and agreeable odor, resembling closely that of pineapples, but this is not apparent to the taste. The oil is said to be used by the natives in place of cod-liver oil and butter.—Merck's Rep., May 15, 1898, 305.

Oil of Theobroma—Specific Gravity and Melting Point.—In the course of their observations on *Suppositories* (which see under "Pharmacy"), Edmund White and J. Oldham Braithwait, speaking of the use of oil of theobroma for their preparation, call attention to the importance of its specific gravity, this obviously determining the amount by weight of the substance capable of being cast in a mold of fixed capacity. The published statements as to the sp. gr. of oil of theobroma being somewhat conflicting, the authors deemed it desirable to determine the sp. gr. of samples of oil prepared from the cocoa itself, in order to exclude the possibility of contamination—either accidental or intentional. Having been supplied with samples of untreated cocoa-nibs, in the natural condition, representing the chief variety found in commerce, and duly authenticated as to their origin, the oil was prepared from them as follows: Four ounces of each kind were finely ground, enclosed in strong linen, and squeezed in a hydraulic press between plates previously heated in boiling water. The expressed oil was then collected and obtained in a pure and bright condition by filtration through paper in a hot water funnel. A portion of each oil so obtained was solidified, air bubbles being carefully excluded, and its sp. gr. determined by floating in diluted alcohol (at 15° C.) of known sp. gr. They also determined the melting point of the oils by the capillary tube method, the determination not being made until twenty-four hours after solidification in the tube. The results are embodied in the following table:

Variety.	Sp. Gr. at 15° C.	Melting Point.
Guayaquil	.948	33.6–33.9° C.
Grenada	.970	33–33.3° C.
Trinidad	.950	31.5–32.5° C.
Ceylon	.980	33–33.6° C.
Caraccas	.974	33.9–34.2° C.

—Pharm. Journ. Nov. 20, 1897, 439.

Oil of Theobroma—Variation of Specific Gravity on Keeping.—During some experiments made subsequent to those detailed in the paper of Messrs. White and Braithwaite on "*Suppositories*" (which see under "Pharmacy"), Mr. White made some observations which make it evident that the results given in the preceding table can not be accepted as trustworthy, since, probably owing to some molecular disturbance caused by the heat applied in melting the fat, the specific gravity of the same sample increases from day to day until, after a time, the effects of this disturbance pass away. In Mr. White's present experiments, portions of five samples of oil were just melted and cast in small porcelain crucibles so as to have, after solidification, the form of flat cakes. This form was adopted in preference to the conical suppository form, as there seemed less risk of including air bubbles in the former case. The specific gravity of each sample was determined an hour later, then on three succeeding days, and finally three weeks later, with the results embodied in the following table:

Variety of Oil.	Specific Gravity.				
	1st day.	2d day.	3d day.	4th day.	3 weeks later.
Guayaquil	.977	.983	.984	.992	.995
Grenada	.978	.986	.990	.993	.997
Trinidad	.983	.991	.992	.992	.994
Ceylon	.975	.982	.989	.991	.991
Caraccas	.979	.984	.987	.998	.998

The sp. gr. was in all cases determined by floating the cakes of oil in dilute alcohol at 15° C. The sp. gr. of the alcohol was afterwards determined by a picnometer form of hydrometer, the graduations of which had been carefully standardised by comparison with the results obtained by a Regnault's bottle. It is advisable to keep at hand a series of diluted alcohols so as to get approximately near, at the first attempt, to the sp. gr. required. Final adjustment should be made by addition of more or less dilute alcohol—not strong alcohol, since the latter fluid causes a sensible rise of temperature if it be added to weaker alcoholic fluids. It will usually be found that some air bubbles remain obstinately attached to the piece of floating oil. These may be detached by smartly tapping the piece of oil beneath the surface of the fluid with a glass rod. It is always best to get the substance into a form free from sharp ridges or angles, and with a polished surface.

Experiments were also made which prove that the observed variations were not due to inequalities in the interior portion of the oil.—Pharm. Journ., Jan. 22, 1898, 69.

Butter—Method of Distinction from Oleomargarine.—J. Hoffmann finds that when a drop of 10 per cent. etherial solution of butter is allowed to fall from a height of ½ millimeter on to a plate of glass, it leaves a circular residue, which always has a crenate margin, whereas oleomargarine similarly treated, leaves a spot with a markedly serrate margin—this distinction becoming more marked if to a 20 per cent. ethereal solution of these fats 10 per cent. of absolute alcohol is added, and the drop is allowed to evaporate. In the case of butter, then, an unbroken fatty residue with a crenate edge is left, while oleomargarine leaves an aggregation of scattered oil globules.—Pharm. Journ., Aug. 28, 1897, 192; from Chem. Ztg. xxi, 571.

Neatsfoot Oil—Determination of Character.—In order to supply trustworthy data concerning the characters of neatsfoot oil, J. H. Coste and E. J. Parry have examined a sample (I) which was obtained through one of the most reliable trade sources, and two others (II and III) which they prepared themselves, with special regard to details for obtaining the oil in a pure condition; the following being a summary of their results:

	I.	II.	III.
Specific gravity, $D\,\frac{15.5^\circ}{15.5^\circ}$ C.	0.9163	0.9169	0.9174
Temperature rise with equal volumes of sulphuric acid.	51° C.	58° C.	56° C.
Viscosity at 140° F. (Redwood's viscosimeter)	74 Sec.	70 Sec.	——
" " 200° F. " "	——	43 Sec.	——
Iodine absorption by Hübl's method	65.2 p. c.	71.1 p. c.	72.4 p. c.
Percentage of potash (KOH) for saponification	18.9	19.55 19.66	19.74
Free acid, calculated as oleic acid	——	trace	0.37
Free acid, saturates KOH	——	——	0.07
Insoluble fatty acids by Hehner's method	——	95.3	95.5

The fatty acids of these three samples were obtained by saponifying a large quantity of the oil, washing with water and drying at 100° C. An analysis of these gave the following results:

	I.	II.	III.
Specific gravity, $D\,\frac{100^\circ}{100^\circ}$ C.	——	0.8742	0.8800
Iodine absorption	68.4	74.5	75.8
Percentage of KOH for neutralization	19.17	20.12	20.06
Mean combining weight	292	279	208
Solidifying point	——	——	26.1 C.
Melting point	30° C.	29.2° C.	28.5° C.

In each case the fatty acids were nearly white, crystalline, and almost odorless. The author calls attention to the fact that the figures show that the samples of known neatsfoot oil closely resemble one another more than they do the trade sample. Of ten samples examined by the authors only two agreed reasonably well with the pure samples prepared by them. One sample contained a considerable proportion of paraffin and the rest appeared to contain other mineral oils, with cotton-seed and probably linseed oil.—Amer. Journ. Pharm., April, 1898, 214–215; from Journ. Soc. Chem. Ind., xvii., 4.

Lard—Detection of Vegetable Fats—Forster and Reichelman detect the presence of vegetable fats in lard by testing for phytosterin (see Proceedings 1897, 682) which is distinguished from the cholesterin of animal fats by the character of its crystallization. According to Salkensky the cholesterin of animal fats crystallizes from the alcoholic solution in the form of very thin rhombic tablets, while the physosterin of vegetable fats forms solid, stellate, sometimes broad bundles of needles, and, when the physosterin crystallizes out slowly, well formed, elongated, hexagonal tablets are obtained. This, according to Salkowsky, is never the case with cholesterin, for even when the needles of physosterin are separated quickly they mostly show a characteristic point at the free end. The test is carried out as follows: 50 Gm. of the suspected lard are boiled for about five minutes with two successive portions of 75 Cc. of 95 per cent. alcohol, under a reflux condenser, and continuous agitation. The mixture is well cooled and the alcohol is drawn off from the fat through a filter. The filtrate is then boiled on a water-bath with 15 Cc. of 50 per cent. soda solution until about three-fourths of the alcohol has evaporated, the residue is dried and shaken out with ether. The ethereal extract is distilled to dryness, the residue redissolved in a little ether to remove a little soap, and the ethereal solution again distilled to dryness. The residue is then recrystallized from 95 per cent. alcohol, and the crystals obtained examined under the microscope—the examination being preferably carried out with polarized light.—Pharm. Centralh., xxxviii., 151.

Wool-fat—Purification of the Crude Product.—Hurwitz believes that pharmacists who use wool-fat in large quantities will find it profitable to purify the crude article of commerce, and recommends the following process: The fat is melted in a large vessel on a water-bath, sodium bicarbonate is stirred in to make a mixture strongly alkaline to litmus, and enough water is added to make a thin emulsion. The mixture is boiled about fifteen minutes, when enough salt is added to break up the emulsion, and the partially saponified fat is then removed to another vessel. The fat is then added in small portions at a time to water kept boiling in the original vessel; it is skimmed off as it rises to the top, and after all is skimmed, it is kneaded with successive portions of cold water until the latter passes off clear. Lastly the fat is boiled once more with water, skimmed off while hot, and dried on a steam bath until it is practically anhydrous.—New Engl. Drugg., 1897, 650.

Wool-fat—Chemical Composition.—In a fifth contribution on the subject of wool-fat, Darmstaedter and Lifschuetz report that whereas wool-fat wax consists of as much as 65 per cent. acids, the "soft fat" contains not more than 40–45 per cent. The lanoceric acid and the lanopalmitic acid which are so characteristic of the wax, do not at all occur in the soft fat. This is characterized by a large percentage of an oily acid, about 40 per cent. of the total acids. Both wax and soft fat contain myristic and carnaubic acid. The alcoholic portion (55–60 per cent.) of the soft fat seems to contain carnaubylic and cerylic alcohol, and is characterized by a considerable percentage of isocholesterin, which does not occur in the wax. On the other hand the cholesterin which occurs in the wax seems to be entirely wanting in the soft fat.—Pharm. Review, April, 1898, 144; from Berichte, 31, 97.

Volatile Fatty Acids from Wool—Industrial Importance.—A. and P. Buisine think that the production of the volatile acids from the wash waters of wool is now of commercial importance, and they communicate a method by which they may be distilled and condensed by water vapor. The waters are first allowed to ferment for eight days, then boiled to drive off the ammonia, then acidulated with sulphuric acid and distilled. The volatile fatty acids found in the largest quantities are acetic and propionic, but they also get a fair percentage of butyric, valerianic, caproic, and benzoic acids, with traces of formic and caprylic acids and phenol. Amongst other applications, this mixture of raw fatty acids is particularly suitable for the production of acetone, methyl-ethylacetone, and the higher acetones which are contained in the mixture known as "oil of acetone."—Chem. News, Dec. 31, 1897, 326; from Compt. rend., Nov. 15, 1897.

In a subsequent paper the author communicates the following outlines of a method for preparing

Oil of Acetone.—The volatile fatty acids isolated from these wash-waters are saturated with lime and the solution evaporated to dryness. The dried salts of lime are then distilled. The return of oil of acetone from waters of 11° Baume is, by this method, about 15 liters per cubic meter, and the operation can be carried out at a very low price.—Chem. News, Feb. 18, 1898, 83; from Compt. rend., Jan. 24, 1898.

Tallow—Removing Rancidity.—E. Dieterich removes the rancidity in tallow by adding to 100 parts of the rancid fat, melted over an open fire, 2 parts of prepared chalk and 5 parts of lime water, boiling under stirring until a scum removed from time to time no longer rises, and the tallow becomes clear and golden-yellow in color. It is then boiled and stirred with 5 parts of sodium chloride during five minutes, and finally strained or filtered through paper in a hot funnel.—Pharm. Post, Jan. 2, 1898, 4.

Cerotic Acid—Preparation and Molecular Formula.—Heurignes has determined the acid number of pure cerotic acid, and finds that it agrees better with the formula $C_{26}H_{52}O_2$, than with any other. The acid was prepared from Chinese insect wax, which consists chiefly of ceryl cerotate. The latter was obtained pure by suitable means, the purified ester, melting at 81.5° C., was saponified in petroleum spirit solution with alcoholic soda, the solvents were evaporated, and the diluted solution was precipitated with calcium chloride. A mixture of ceryl alcohol and calcium cerotate was thus obtained, from which the ceryl alcohol was, after washing and drying, removed by repeated extraction with acetone. The residual calcium cerotate was decomposed by acid, and the cerotic acid purified by recrystallization from petroleum spirit, or from glacial acetic acid. Thus prepared, the pure acid has a melting point of 78.5° C. Alcohol cannot be used for recrystallizing the cerotic acid, because ethyl cerotate is always formed, and the product has a low melting point. Concerning

Ceryl alcohol the author observes that as ceryl alcohol is convertible into cerotic acid by heating with soda lime, it must belong to the same series as that acid. This view was confirmed by the saponification number of the acetic ester, melting at 63.5° C. The formula for ceryl alcohol is consequently $C_{26}H_{54}O$, and that of ceryl cerotate, $C_{26}H_{51}O_2.C_{26}H_{53}=C_{52}H_{104}O_2$. —Pharm. Journ. July 31, 1897, 82; from Ber. d. Chem. Ges. xxx., 1415.

Morrhuol—Examination of a Commercial Sample.—Gundlich has examined commercial "morrhuol" and finds it to correspond to a product made by him from cod liver oil by Chapoteaut's process, which consists in removing the free fatty acids from the oil by treatment with sodium bicarbonate at a low temperature, then dissolving out the supposed active substances by shaking with 90 per cent. alcohol. The oil used for this purpose contained neither iodine nor bromine, but contained considerable quantities of amines, which, together with a large proportion of the alkaloids found in cod liver oil, are dissolved out by the alcohol and contained in the morrhuol.—Journ. Pharmacol., 1897, 223.

Cholesterin—Form contained in the Lower Cryptogams.—According to E. Gérard certain microbes and algæ contain a form of cholesterin, which, in general characters, closely agrees with the ergosterin of Tanret, with which it is probably identical, and differs widely from animal cholesterin and from the phytosterin of the higher plants. The body was isolated from cultures of *staphylococcus albus* and from *fucus crispus*. This cholesterin dissolves entirely in strong sulphuric acid, giving a blood red color. The solution, shaken with chloroform, leaves the latter uncolored. The sulphuric acid solution diluted with water gives a greenish precipitate, not white, like that obtained from animal cholesterin; with a solution of the new body in carbon tetrachloride concentrated sulphuric acid gives a deep red color, and the tetrachloride assumes a bright green tint. Both this cholesterin and ergosterin are decomposed and become colored on exposure to the air.—Pharm. Journ., June 4, 1898; from Journ. de Pharm., 1898, 375.

CARBOHYDRATES.

Wood—Modern Methods of Carbonization—Klar gives an interesting description of the modern methods of distilling wood for the production of acetic acid, wood spirit (methyl alcohol), acetone, etc. The old, wasteful method of charring wood in heaps is no longer practiced except in countries where forest lands are still abundant; and even there, as in America for instance, efforts are being made to turn forest wealth to better account, large works being started in suitable localities for the carbonization of wood with special reference to the production of calcium acetate and methyl alcohol. The apparatus most generally employed are: (1) Carbonizing apparatus for leaved wood, in which either horizontal or vertical retorts are employed. (2) Carbonizing apparatus for wood waste, saw-dust, and the like. (3) Carbonizing apparatus for the wood of coniferous trees. The latter requires a special arrangement for separating the oil of turpentine and resin in addition to the usual condensing apparatus. The carbonizing plant with horizontal retorts is the one generally adopted in Germany, the arrangement being in pairs and resembling that commonly in use in illuminating gas-works. The carbonization in vertical retorts and the separating plant is similar to that used in the case of horizontal retorts, the wrought iron cyclinders being also arranged in pairs. But here it becomes necessary to remove the individual cylinder when the combustion is completed, and to replace it by one freshly charged; whereas in the case of the horizontal retorts the charge is introduced and the charcoal removed while in their fixed position. For detailed description, the reprint of the author's paper may be consulted in Pharm. Era, Oct. 21, 1897, 596.

In connection with the foregoing paper of Klar, that of Max Winckel, showing and describing a modern plant for the carbonization of wood is very opportune. The author observes that within the last ten years this industry has been developed tremendously, and the competition from countries rich in forest lands has assumed such proportions as to endanger the existence of European manufacturers. Hence, every endeavor is made to improve the methods of carbonization, so that the yield of the different products of combustion may be increased and that there shall be the utmost economy in labor and material. German manufacturers prefer the horizontal retorts to the vertical, because they are handled more economically and because the cost of plant is very materially reduced. According to the extent of the works, twenty or more wrought-iron retorts, arranged in pairs to form a battery are employed, each set of two retorts having a separate fire and condensing arrangement, the products of condensation passing into a conduit common to all the retorts, while the incondensible gases either pass direct into the furnace to aid in the combustion of the wood, or are collected in a reservoir, whence they find volatilization as fuel and for illuminating purposes. With these preliminaries a brief explanation of the drawing (Fig. 87) will be readily followed. The retort is shown at *a*. The products of combustion pass into the condenser *b*, whence the liquid products —tar and pyroligneous acid—reach the common conduit *d*, and through this flow into settling tanks, *fff*, while the gaseous products pass through the washing apparatus *c* into the pipe *e*, and thus reach the furnace direct; or indirect from the gas reservoir, if such be provided. The intervention of the washing apparatus *c*, serves the purpose of preventing the return of flame from the furnace, and consequent explosion of the apparatus.

From the settling tanks *fff* the crude pyroligneous acid is pumped at *g* into the huge storage tank *h*, while the tarry products of decomposition are removed from time to time at *i*. The crude acid, which still deposits considerable tarry matter in the storage tank, contains about 10 per cent. of acetic acid, 1 per cent. of methyl alcohol, and about 0.1 per cent. of acetone, together with certain other organic acids and esters as impurities. The preliminary separation of these is effected in a system of three stills, shown beneath the bracket marked *k* in the drawing. The crude acid is supplied to the first and larger of the stills from *h*, where it is freed by distillation from most of the tar still remaining in it; the vapor from this

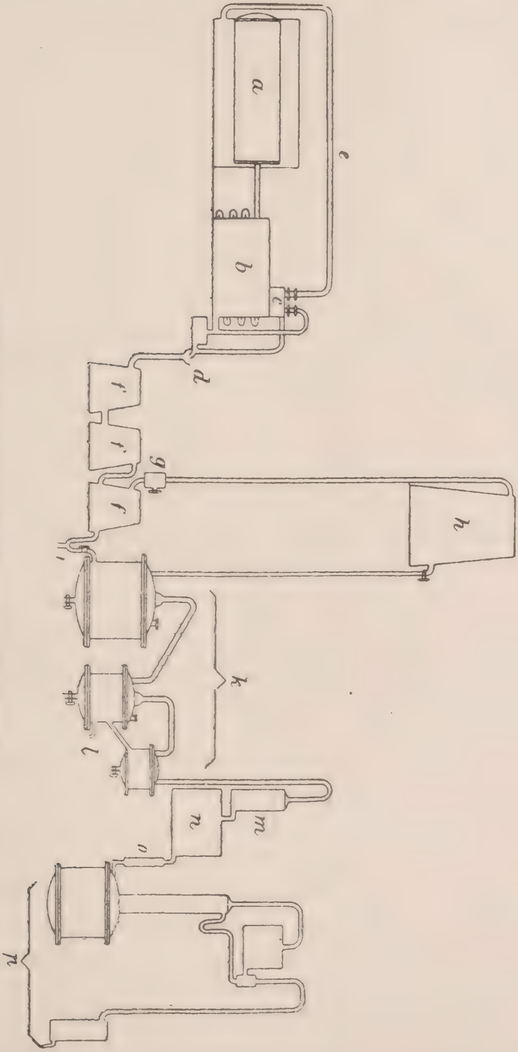


FIG. 87.

Modern Method of Carbonization of Wood.

passes into the second still, containing lime, and here parts with acetic acid, which is drawn at *l* in the form of calcium acetate; the methyl alcohol passes into the third still, along with water, and from this into a condenser, *m*, and through this into a receiving tank, *n*. The crude methyl alcohol, or wood spirit, now constitutes a greenish-yellow, mal-odorous fluid, containing much water, and as impurities acetone, aldehydes, ketones, amines, and also some tarry matter and hydrocarbons, from which it is freed by a system of rectification through an alcohol-column, similar to that employed in the manufacture of alcohol from crude spirit. This system of rectifiers is shown over the bracket marked *p*. The crude wood spirit is passed through charcoal at *o*, whereby tarry impurities are removed, and, entering the still containing milk of lime, heat is applied and its vapor is passed through the alcohol column arranged in the well-known manner into numerous divisions for the interception and collection of the less volatile components. The more volatile methyl alcohol passes through the topmost condensing vessel in the state of vapor, to be then condensed in its further passage, while the condensed liquid flows back into the column to be there deprived of any methyl-alcohol that may have been condensed with it. In this way a colorless spirit containing from 92 to 99.5 per cent. methyl alcohol is obtained; but it still contains some impurities—notably acetone—from which it can be freed only by the use of chemical agents, and by methods which are withheld by the manufacturers.—Pharm. Ztg., Oct. 30, 1897, 744-745.

Modern Paper—Deterioration.—Sir H. Trueman Wood writes that a committee of the Society of Arts is now at work on the subject of the deterioration of modern paper. It is a matter of general repute that many books are now printed on paper of so inferior a character that it is liable to perish in a short space of time. The committee are anxious to have definite examples before them of books that have thus suffered, and the author therefore solicits that any one who has had experience of such cases should communicate the facts to him, if possible with examples of books printed within the last fifty years in which the paper shows sign of perishing—Chem. News, Dec. 10, 1897, 289.

Oxy-Cellulose—Formation and Properties.—Experiments made by Vignon on the action of oxidizing substances on cellulose, in the form of pure cotton, show that the most satisfactory results are obtained by the use of a solution of potassium chlorate acidulated with hydrochloric acid. Pure cotton plunged into this mixture at a boiling temperature for one hour is in great part converted into oxy-cellulose, the formula for which, according to the author, is $C_{24}H_{33}O_{21}$ or $4(C_6H_{10}O_5)-H_2+O$. Oxy-cellulose has a greater affinity than cellulose for basic coloring matters. It partially dissolves in aqueous potash solution, giving a liquid which reduces Fehling's reagent, and is re-precipitated by acids. It gives an intense violet coloration with Schiff's reagent, and would, therefore, appear to possess aldehydic properties.—Pharm. Journ., Oct. 30, 1897, 378; from Comptes rendus, cxxv., 450.

Gun Cotton—New Solvents.—According to T. Schlumberger gun cotton will dissolve readily in alcoholic solutions of certain salts, such as ammonium chloride, calcium chloride, aluminum chloride, zinc chloride, sodium lactate, potassium and ammonium acetate, etc., without the use of ether, and even when highly diluted. The solutions can also be effected by impregnating the gun cotton with one of the salts mentioned and then adding the alcohol.—Pharm. Centralh., Oct. 28, 1897, 722.

Starch—Comparison of the Standard Methods of Estimation.—H. W. Wiley and W. H. Krug report the results of an extended series of estimations of starch by the various methods. From the vast amount of analytical data obtained, they conclude: 1. All the heretofore described methods for the estimation of starch by polarization are liable to grave errors, and none can be relied upon to give accurate results. 2. In the methods depending upon hydrolysis in an atmosphere of steam under pressure, caramelization is to be prevented by the employment of some organic acid, preferably salicylic acid. The formation of sugars produced by hydrolysis of pentosans increases the quantity of metallic copper obtained and thus raises the apparent per cent. of starch obtained. The pentosan sugars should therefore be determined and a suitable correction made. 3. The direct weighing of the starch, according to the method of Lindet, after the solution of protein by means of pepsin, gives fairly good results and has many advantages for practical work. 4. The solution of starch by means of diastase, without pressure, gives satisfactory results when the diastase is freshly prepared and used in proper quantities and at an appropriate temperature. The diastase exerts only a small solvent action on the pentosans.—Pharm. Review, May, 1898, 201; from J. Am. Chem. Soc., 20, 253.

Starch—Preparation of a Stable Solution for Use as Indicator.—According to "Chem. Ztg.," a stable solution of starch for use as indicator is obtained as follows: Place 200 Cc. of water in a deep capsule with 5 Cc. hydrochloric acid and heat to boiling. Remove from heat and add 20 Gm. of starch, previously rubbed smooth with a little water; stir the mixture until a uniform liquid results, again boil, neutralize with normal soda, and make up the measure to 1000 Cc. with glycerin.—Pharm. Journ., Dec. 18, 1897, 543; from Rép. de Pharm. (3), ix., 158.

Starch—Preparation of Antiseptic Compounds with Acetic Aldehyde and Paraldehyde.—A. Classen prepares combinations of starch and similar substances (dextrin, gums, etc.) with acetic aldehyde and paraldehyde, by subjecting mixtures of these substances to high temperatures under pressure, and removing the excess of aldehyde with alcohol or some other solvent. The methods of preparation as well as the general properties of these compounds are similar to those of the corresponding formic aldehyde compounds (amyloform, etc.) like which they are to be used in the treatment of wounds.—Apoth. Ztg., 1898, 101.

Soluble Starch—Natural Occurrence in Plant Cells.—Guerin has found a substance having the chemical properties of starch dissolved in the cell-sap of *cola acuminata* and *cola ballayi*. The cells in which this substance occurs are almost exclusively epidermal, but it has also been found in the mucilage canals. In the epiderm of the lower surface of the leaves starch-grains of the ordinary kind are present in the same cells as the soluble starch.—Pharm. Journ., Nov. 27, 1897, 458; from Bull. Soc. Bot. de France, 1897, 91.

Soluble Starch—Condition of its Formation—A. Wroblewski finds that soluble starch can be prepared from starch either by boiling with water or with 2 per cent. potash solution; in the latter case acidulating and precipitating with 95 per cent. alcohol. Starch treated in this manner gave 50 to 60 per cent. of snow-white soluble starch, which dissolves to the extent of 3 per cent. in cold water, but is almost insoluble in 40 per cent. alcohol. Soluble starch is no doubt none other than the first product in the hydrolysis of starch. The action of alkalies on starch is similar to that of diastase, and alkalies, if slower, have greater hydrolytic power.—Zeits. Physiol. Chem., xxiv., 174.

Soluble Starch—Conversion from Ordinary Starch without Formation of Dextrin.—According to Syniewski starch may be converted into the soluble form without production of dextrin by treatment with sodium peroxide as follows: To a solution of 50 Gm. of the peroxide in 500 Cc. of well-cooled water, a mixture of 50 Gm. starch with 500 Cc. water is added with stirring. A jelly is formed, which becomes perfectly liquid after half an hour, copious evolution of gas taking place meanwhile. On adding alcohol (95 per cent.) a viscid precipitate is thrown down. It is separated, dissolved in cold water, neutralized with acetic or hydrochloric acid and again precipitated with alcohol, these operations being repeated until the product is free from ash. Finally the precipitate is washed with absolute alcohol, washed on a filter with ether, and dried in a vacuum; it then has the appearance of a snow white amorphous powder, without taste or smell, having a composition represented by the formula $C_{18}H_{32}O_{16} = 3C_6H_{10}O_5H_2O$, or a multiple of it. The substance is readily soluble in cold water; it gives, with iodine, a clear blue coloration, and the yield amounts to about 90 per cent.—Pharm. Journ., Jan. 15, 1898, 45; from Berichte, xxx., 2415.

Iodide of Starch—Proportions of Iodine Required for Raw and for Boiled Starch.—According to the experiments of C. O. Harz iodine combines in different proportions with starch in the raw state and with starch in the form of mucilage. The raw starch combination approximates to Payen's formula $(C_6H_{10}O_5)_{10}I$, while the starch mucilage combination accords with the formula, $4[(C_6H_{10}O_5)_4I] + HI$, of Mylius. Raw rice starch absorbs 6.44 per cent., the paste, 17.61 per cent.; wheat starch, raw, 7.62 per cent.; paste, 20.72 per cent.; potato starch, raw, 6.73 per cent.; paste, 20.68 per cent.—Pharm. Journ., May 21, 1898, 473; from Journ. de Pharm. (6), vii., 426.

Cane Sugar (Saccharose)—Synthesis.—L. Marchlewski has obtained cane sugar by the action of aceto-chlorhydrose upon the potassium salt of *d* fructose (potassium levulosate). Pure aceto-chlorhydrose is dissolved in alcohol, and freshly prepared potassium levulosate is added to the solution. The mixture is allowed to stand at the ordinary temperature for about seven days, and is then heated for half an hour on the water-bath to complete the reaction. Next, the potassium chloride is removed by filtration, the filtrate evaporated at 80° C., and the residue dissolved in boiling water. The aqueous solution so obtained is treated with solution of calcium hydrate, the precipitate formed is removed on a filter, stirred into some water, and decomposed by carbonic acid. The calcium carbonate having been filtered off, the filtrate is once more precipitated by calcium hydrate, and this precipitate treated as before. Finally the aqueous solution is extracted with ether, and then evaporated *in vacuo*, when, after some days standing, cane sugar will crystallize out in the well-known form. All the reactions and physical properties of this synthetical product agree with those of natural cane sugar.—Amer. Journ. Pharm., Nov. 1897, 608–609; from Journ. Soc. Chem. Ind., July 31, 187.

Sugar—Determination at the Dispensing Counter.—The following suggestions concerning the determination of glucose, while bringing nothing that is absolutely new, are of sufficient practical importance to merit the attention of the busy pharmacist. R. C. Cowley and J. P. Catford show how, with the ordinary utensils of the dispensing counter, it is quite possible to make, within a few minutes, an accurate quantitative examination of urine, or other liquid, for glucose. The apparatus required will be a two-drachm cylindrical minim measure, to replace a burette; a small porcelain capsule, and a ring support for the capsule so that it may be suspended over a convenient gas-jet or other flame. The principal reagent required is Fehling's solution, which should be kept, as is customary now, in separate solutions of copper sulphate in the one and alkaline sodium tartrate in the other, and of such strength that when the two are mixed in equal volume they constitute a Fehling's solution of normal and correct strength. The authors, however, give specific directions for preparing these two solutions, as well as of testing them if old or of doubtful quality. The actual process is then conducted as follows: 100 minims of each of the solutions (cupric and tartrate—equal to 200 minims of the normal Fehling's solution) are measured into the capsule, and the measure rinsed once or twice into the same. The contents of the capsule are then heated to gentle ebullition, and a measured quantity of the urine is gradually added until the blue color disappears—the final point being best indicated by a solution of potassium ferrocyanide in acetic acid, a drop of which brought in contact with a drop of the solution under treatment, gives evidence of the presence of copper by the brown color produced, and sharply defines its absence by remaining colorless.

Since 100 Cc. of Fehling's solution are reduced by 0.5 Gm. of glucose, the 200 minims of the solution used in the experiment are reduced by 1 grain of glucose.* This being the quantity contained in the urine consumed, it is only necessary to divide the number of minims so ascertained into 100, when the percentage is at once found—thus: 25 minims of urine = 4 per cent. of glucose, 35 minims = 2.85 per cent., 125 minims = 8 per cent., etc.

Cane sugar can be determined with like facility, it being necessary preliminarily to boil it with 1 per cent. of hydrochloric acid so as to convert it into glucose. The amount of glucose being determined as described, the quantity of cane sugar is then ascertained by multiplying with the fraction 0.95—5 parts of glucose being equivalent to 4.75 parts of cane sugar.—Pharm. Journ., March 19, 1898, 283, 284.

Sugar—A Practical Method for its Determination in Urine.—Arthur McKellar gives a brief description of the processes most in favor for the determination of sugar in urine, but declares his preference for the following, a combination of Trommer's and Pavy's, which was devised by his predecessor, but has been used by him successfully for a considerable period. A stock test solution is prepared according to the following formula: Pure copper sulphate, 90½ grains; distilled water, 2 ozs., 225 grains; glycerin, 4 ozs. weight (Avoir.–Rep.). Each ounce of this solution will decompose 1½ grains of sugar. A qualitative test having been made, after the method of Trommer, by boiling equal amounts of this test solution and of liquor potassæ together in a test tube, and allowing a little of the suspected urine to run in while the mixture is boiling, the quantitative test is then made as follows:

A half ounce of the test solution is carefully rinsed with a little water into a four-ounce Florence flask, an equal bulk of liquor potassæ is added, and finally a large excess of liquid ammonia; the whole is then boiled, and the urine, diluted according to its supposed strength, say with 1 or 2 parts of water, is then allowed to run into the boiling liquid, a few drops at a time, with the aid of a stirring rod. When the reaction is complete, the blue color has entirely disappeared and the liquid has become clear. The actual amount of urine used having been noted, this will have contained three-quarters of a grain of grape sugar, and the result calculated to grains per ounce, as it is usually given. The whole operation need not take more than a couple of minutes. The vapor of the boiling ammoniacal liquor serves to keep off the atmospheric influence on the copper oxide, but on the removal of the source of heat oxygen is absorbed from the air and the blue color gradually returns as the liquid cools. The advantages of the method are briefly the following:

1. A practical permanent sugar test always ready for use.

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* The weights and measures here refer to the B. P. If those of the U. S. P. are used, there must necessarily be a slight discrepancy.—Rep.

2. The end reaction is sharp.

3. No special apparatus required beyond what is always in the drug shop.—Pharm. Journ., Feb. 19, 1898, 168–169.

Diabetic Sugar—Efficiency of Gerrard's Cyano-Cupric Test.—Prof. L. E. Sayre has made some experiments which appear to prove the accuracy and convenience of the test for diabetic sugar proposed several years ago by Gerrard and known as the cyano-cupric test. This test is applied as follows: Ten Cc. of freshly prepared Fehling's solution are diluted with 40 Cc. of water and the liquid heated to boiling. A five per cent. solution of potassium cyanide is gradually added until the solution is nearly colorless. Then very cautiously, drop by drop, while the liquid is still boiling, the cyanide is added until the blue color just disappears. Of course it will be seen that an excess of the cyanide solution must be carefully avoided since the accuracy of the test depends upon just this point. Now, 10 Cc. of Fehling's solution are added to the cyano-cupric solution, and the test is ready. The urine or saccharine solution to be tested is now added in the same way precisely as in testing for sugar by Fehling's test. The "end point" is indicated by the disappearance of the blue color—a point which can be more accurately observed because of the cuprous oxide having been dissolved instead of precipitated, as in Fehling's test. Inasmuch as only the second measure of Fehling's solution suffers reduction, it follows that 10 Cc. only of the Fehling's solution is to be employed as one of the factors in computing the percentage of sugar.

This process of Gerrard, if conducted expeditiously and if the coloring matters in the saccharine solutions be not too deep, gives us a high degree of accuracy, and a method which, in the opinion of the author, will probably supersede all the other forms of copper determinations of glycosuric urine.—Drugg. Circ., May, 1898, 100.

Grape Sugar, Milk Sugar, etc.—New Volumetric Method of Estimation.—E. Riegler recommends a process for the estimation of grape sugar, milk sugar, and other bodies reacting with Fehling's solution, which depends upon the determination of copper in a given volume of that reagent, then submitting a like volume of the reagent to the reducing action of the sugar to be estimated, again determining the copper, and from the difference, which represents the copper reduced by the sugar, calculating the amount of reducible sugar present. Copper is to be determined by de Hoen's method, and copper values taken according to Allihn's tables.

The copper solution is prepared by dissolving 34.64 Gm. crystallized copper sulphate in 500 Cc. water. The Rochelle salt solution consists of 173 Gm. Rochelle salt and 50 Gm. caustic soda dissolved in 500 Cc. water. The amount of copper in 10 Cc. of the copper solution is determined, once for all, as follows: To 10 Cc. of the copper solution, measured with much care into a 200 Cc. flask, are added 10 Cc. of Rochelle salt solution, about 100 Cc. water and 2 Cc. pure concentrated sulphuric acid and all mixed well; when cool, about 1 Gm. potassium iodide, dissolved in 10 Cc. water, is added, and after 10 minutes, 3 Cc. starch solution, and the free iodine titrated by means of decinormal thiosulphate solution until the blue color disappears and the solution remains colorless for at least 5 minutes. From the amount of iodine found, the copper contained in the 10 Cc. used is calculated according to the equation: $2CuSO_4 + 4KI = 2K_2SO_4 + Cu_2I_2 + I_2$.

To determine grape sugar, exactly 10 Cc. of copper solution are measured into a beaker, capacity about 200 Cc., 10 Cc. Rochelle salt solution and 30 Cc. water are added, heated to boiling on a wire gauze; to the boiling solution 10 Cc. of sugar solution, which must be approximately 1 per cent., are added from a pipette, and boiling continued for a few seconds. The beaker is removed from the fire, the precipitate allowed to subside, the clear liquid filtered through a small filter, and precipitate and filter washed with 80 Cc. water. In the filtrate the copper is determined as before, the difference in copper being the quantity reduced by the sugar to which it is changed by consulting Allihn's tables.

Determination of Milk Sugar in Milk.—To remove albuminoids, which would interfere with the estimation of milk sugar, the author recommends a solution of asaprol, prepared by dissolving asaprol 15 Gm., citric acid, powdered, 15 Gm., in water 500 Cc. Of the reagent 15 Cc. are poured into a 100 Cc. measuring flask, exactly 10 Cc. milk are added, and water to make 100 Cc.; the mixture is well shaken, warmed to about 60° C., and filtered. Of the filtrate, which is transparent and free from albuminoids, 20 Cc. are measured into a beaker, 10 Cc. copper solution, 10 Cc. Rochelle salt solution and 30 Cc. water are added and boiled for six minutes. The precipitate is allowed to subside, the liquid filtered while still hot, and the filter washed as before. From the amount of copper reduced, determined as previously described, milk sugar is calculated according to Soxhlet's table.—Pharm. Review, March, 1898, 111; from Zeitsch. f. anal. Chem., 1898, 22.

Gentianose—Evolution in the Growing Plant.—From his experiments made upon growing plants, E. Bourquelot infers that gentianose, the specific sugar of gentian, like sucrose in the beet root, is split up into assimilable sugars in the course of the growth of the plant by special ferments which are localized in the growing parts of the plant. A solution of the gentianose was without action on Fehling's solution, but the same solution to which a little of the powdered growing parts of *gentiana acaulis*—selected because the growing parts of *g. lutea* were not available—had been added, gave a copious reduction. The soluble ferments of *aspergillus niger* also cause the hydrolysis of gentianose; so does invertin, but less rapidly than with saccharose. Emulsin, saliva and diastase are without action on gentianose.—Pharm. Journ., May 28, 1898, 506; from Journ. de Pharm., 1898, 369.

Mucilage—Definition, Origin and Detection in Plants.—Henry Kraemer has contributed a paper on the origin and detection of mucilage in plants which will be referred to with advantage by students of vegetable physiology. He observes that by the term "mucilage in plants" is meant those substances which are soluble, or at least swell very perceptibly in water, and which, upon the addition of alcohol, are precipitated in a more or less amorphous or granular mass. Mucilage originates in the plant either as a part of the contents of the cell or as a part of the wall thereof. When it occurs as a part of the cell contents (as cell sap), mucilage is produced either as a secretion ("Ausscheidung") from the protoplasm, or it may possibly arise in some cases as a disorganization product of some of the contents. When it occurs as a "membrane mucilage," it owes its origin to several causes, viz.: either as a form of secondary thickening or addition product to the wall; or as a metamorphosis of the cell wall, at least in part. In the latter case it may arise either as a disorganization product of the primary wall as an intercellular substance; or of the subsequent lamellæ making up the pith, medullary ray, parenchyma and other cells. In addition to these two well-authenticated cases of the origin of mucilage, viz., as a cell content and cell membrane, we have mucilage given out by some secreting hairs (glands). In such instances we can simply say that the mucilage appears between lamellæ of cutin on the one hand and of cellulose on the other hand, of the epidermal cells of the secreting hair.

The localization of the mucilage in plants is easily effected by using methylene blue as reagent. It has the advantage that it is decisive, as only some lignified cell-walls otherwise take up the color, and it may be applied by proper manipulation to dry as well as fresh plant material. Thus, for example, the peculiar sub-epidermal mucilage cells, which occur in all the leaf-like elements of *viola tricolor*, L., with exception of the stamens, are easily ascertained by placing fresh specimens of the leaf in an alcoholic solution of methylene blue of the strength: 0.4 Gm. to 100 Cc. alcohol of 95 per cent. The specimen is left in this solution for at least several hours, after which surface and transverse sections may be made and transferred to a slide having upon it a few drops of the following:

Glycerin Methylene Blue Solution: Methylene blue, 0.4 Gm.: alcohol (95 per cent.), 20.0 Cc.; glycerin (nearly anhydrous), 80.0 Cc. The cover glass is put upon the section, and in a short time the mucilage cells are stained blue and are readily distinguished from the remaining unstained cells. Preparations so prepared may be kept indefinitely; indeed, the contrast is more marked after a few weeks than on the first day. The author gives details in fourteen examples of different plant material, accompanied by illustrations showing the mucilage cells, etc., in the color communicated by the treatment recommended.—Amer. Journ. Pharm., June, 1898, 285–291.

Agar-Agar—Preparation of Culture Medium.—Dr. Herman B. Sheffield describes in detail a simple method for preparing nutrient agar-agar, by which he overcomes, to a great extent, the difficulties encountered in the filtration of the culture-medium. The paper may be consulted in "Merck's Rep.," Dec. 15, 1897, 762; from N. Y. Med. Jour.

ORGANIC ACIDS.

Acetic Acid—Industrial Production in Norway from Saw-Dust.—According to a British Consular Report, the dry distillation of acetic acid, wood alcohol, and tar and charcoal from saw-dust is one of the latest enterprises in Norway, where at Fredrikstad, a factory, with a capacity of 10,000 tons of saw-dust annually, has been started. The charcoal bricks are exported to the Netherlands, the acid and alcohol to Germany, and the tar is mostly consumed at home.—Pharm. Journ., Jan. 8, 1898, 41.

Lead Acetate—Commercial Quality.—In connection with his criticisms and experiments upon "Liquor Plumbi Subacetatis" (which see under "Pharmacy"), Frederick W. Haussman had occasion to examine into the quality of commercial lead acetate, the character of which is largely responsible for the accuracy or inaccuracy of Goulard's extract and similar preparations. Thus its liability to lose water of crystallization when exposed to our summer temperature may cause it to become stronger, though this is not so much to be feared as, that by prolonged exposure to the air, it may become weaker from the absorption of carbonic acid and conversion of acetate into insoluble carbonate. The author has examined fifteen commercial samples of lead acetate, and found every specimen to contain calcium in varying amonnts. His results are shown in a table, giving the appearance of the salt, the appearance of its solution, the appearance of its precipitate by potassium ferrocyanide, the amount of $\frac{N}{10}$ solution of potassium dichromate required for complete precipitation of a given quantity, etc. These results do not indicate that there is much variation in acetate as found in the shops. They all contained calcium and iron in small quantities, but none of them required less than 26 Cc. of decinormal solution of potassium dichromate solution for the complete precipitation of 1 Gm. of the lead acetate dissolved in 15 Cc. of water and acidulated with acetic acid. This indicates at least 98 per cent. of absolute lead acetate, and is proposed as an official test.—Am. Journ. Pharm., Nov. 187, 568, 572.

Lactic Acid.—Manufacture and Application.—Alan A. Claflin, who has an experience of seven years in the industrial production of lactic acid, describes the process of its manufacture and gives some interesting information concerning the application in the arts. There it is used largely by woolen dyers as an assistant in mordanting with potassium dichromate, possessing the advantage over tartaric or oxalic acids in the greater solubility of its salts, in greater reducing power, and in less corrosive action. It is used to some extent in calico-printing, but its next important application after that in the woolen industry is in the preparation of hides for tanning, where it is used as a substitute for the bran drench,—which is itself dependent on the lactic acid formed in it by fermentation—for removing the lime from the hides, rendering them more porous and in good condition to receive the tannage. With lactic acid this process can be easier controlled, while its slightly higher cost is more than compensated by the prevention of waste.

A brief outline of the method of manufacture, for the details of which reference must be had to the original paper, may find place here. The lactic acid industry dates back about twenty years, when Mr. Chas. E. Avery began investigations which resulted in the process since followed by the author. In this process one molecule of glucose, from any practicable or convenient source, is split up by a micro-organism, the *bacillus acidi lactici*, into two molecules of ethylidene lactic acid. The form of this bacillus is a double truncated cone, and it is a large species, averaging in length 2 to 2½ Mm. by about 1 Mm. diameter. Like all lactic bacteria it has a tendency to link itself in pairs or short chains. The process of manufacture has three divisions: the preparation of the saccharine solution, the fermentation, and the conversion of the fermented liquor into lactic acid. The proportional composition of the saccharine solution is very important. It should contain 7½ to 11 percent. of saccharine matter, preferably the higher percentage, and it is an advantage that about 10 to 15 per cent. of the total saccharine matter be saccharin. To nourish the bacillus, nitrogenous material, amounting to at least 8 per cent. of the saccharine constituents if calculated as of the composition of albumin (or more accurately a total nitrogen corresponding to 2 per cent. of the saccharine matter), must be added, the most convenient material for this purpose being an extraction of bran obtained by boiling with water and dilute acid. The solution having been made up of the proper composition is boiled for at least an hour to insure its sterilization, and is then conveyed to the fermenting tank where it is rapidly cooled to 55° C. or lower, not going below 45°, and impregnated. For the original impregnation the author uses milk that has been allowed to stand at a temperature of 45° until slightly sour; but the best original impregnation in the author's experience was obtained as follows: A pure culture of the lactic bacillus was obtained from the bacteria in a ferment tank and preserved. Previously sterilized milk was impregnated with this culture, and kept under pure culture conditions for a day, and then used with noticeable advantage over the spontaneously soured milk. The impregnation being accomplished in the saccharine solution, which should be neutral or faintly acid, the main process is begun, the success or failure in the manufacture depending wholly on the management of the fermentation. As the fermentation progresses, the solution must be neutralized with milk of lime, or chalk in suspension. The limits of acidity in which the lactic bacteria are healthy are rigidly confined between 0.02 and 0.5 of 1 per cent., and keeping the acidity of the fermentation between these limits is the main preventive against butyric fermentation, as the regulation of the temperature is the preventive against alcoholic fermentation. If the fermenting solution is overneutralized, the butyric ferment will at once begin to act, and, once active, it is very difficult to control. The fermentation is best completed in from three to six days, though it may be prolonged to a fortnight: but any prolongation of life beyond the shorter time is attended with danger to butyric invasion. To be successful from an economical standpoint over 90 per cent. of the glucose must be converted into lactic acid, and it is quite possible to so convert over 98 per cent. When the fermentation is ended, the liquor must be heated sharply to kill all bacteria and spores. It now consists of solution of calcium lactate, with a multitude of dead lactic bacteria floating in it, which are filtered off, the solution evaporated, and the calcium lactate allowed to crystallize. From this, after purification by repeated crystallization, the acid is prepared by decomposition with sulphuric acid—the product being supplied in form of solutions of various strengths according to demand, one of 50 per cent. being about as concentrated as it is economical to manufacture. This is syrupy, has a more or less brown color, and a specific gravity of 1.20.—Amer. Journ. Pharm., Nov., 1897, 599–604; from Journ. Soc. Chem. Ind., June 30, 1897.

Lactic Acid—Commercial Variations.—Dr. Gadamer mentions as a result of his investigations upon lactic acid that the statement of Kassner that zinc oxide stops the lactic fermentation is not a fact. He has also investigated the characters of five commercial samples of the acid, and found that three of them were dextro-rotatory, while two were mixed in composition, containing 14.3 and 28.6 per cent. of dextro-rotatory acid respectively.—Amer. Drugg. Oct. 25, 1897, 246; from Proc. Soc. Germ. Nat. and Phys., Sept. 1897.,

Strontium Lactate—Use in Bright's Disease.—Dr. Bronowski recommends strontium lactate in doses of 1.0 to 6.0 Gm. per day, given in aqueous solution, in the treatment of advanced cases of Bright's disease, excluding all other treatment. The effects will manifest themselves on the second day, a considerable reduction in the daily secretions of albumen in the urine taking place.—Pharm. Post, xxx., 293.

Benzoiodhydrin—A Substitute for Potassium Iodide.—Dr. Chenal recommends benzoiodhydrin as a substitute for potassium iodide, over which it has the advantage of being effective in smaller doses and in not causing iodism. A dose of two grains is stated to be as effective as 15 grains of potassium iodide. Benzoiodhydrin is crystalline, and is soluble in ether, alcohol or chloroform.—Pharm. Ztg., xlii., 448.

Cinnamic Acid—Process of Extraction from Styrax.—Edw. Claassen recommends the following process for the extraction of cinnamic acid from styrax, which can with equally good results be applied to the extraction of cinnamic acid from certain kinds of benzoin and benzoic acid from the common commercial benzoin, as also the mixed acids from balsam of tolu: Styrax is boiled for some time with an excess of a sodium carbonate solution in a copper or other suitable vessel, and to the mixture when cold and without having been filtered, commercial hydrochloric acid is added in such a quantity as to show finally a faint but distinct alkaline reaction. The contents of the vessel are then heated again to the boiling point, filtered when cold, and the residue on the filter washed with water. To the filtrate, concentrated by evaporation if necessary, is now added a sufficient amount of hydrochloric acid, the precipitate collected on a filter and washed with a small quantity of cold water, after which operations it is dried and extracted with hot rectified benzin. This solution has, after cooling, deposited a considerable amount of cinnamic acid. The benzin is now poured off on the crude acid and the work of extracting repeated as long as it yields acid. In the benzin separated from the last crystallization there is yet left some acid, wherefore it may be shaken repeatedly with a diluted sodium carbonate solution. Hydrochloric acid precipitates from the latter the acid, which is then brought on a filter, washed with cold water and dried. The cinnamic acid obtained at first is very white; later on, the same, particularly that separated from the last sodium carbonate solution, may often be found to be yellowish, in which case it should be treated with benzin as above.—Pharm. Review, July, 1897, 136.

Cinnamic Acid—Use as a Remedy in Tuberculosis.—Dr. T. Heuser records his experience with cinnamic acid for the treatment of tuberculosis, and summarizes his opinions based upon his experience with the remedy, as follows: 1. Cinnamic acid is a drug having great influence on tuberculosis. 2. Gluteal cinnamic acid injections, if cautiously made, are absolutely innocuous. 3. The gluteal cinnamic acid treatment is capable of curing a considerable number of cases of pulmonary tuberculosis. 4. Cinnamic acid is not a specific against tuberculosis. The gluteal injections are used in the quantity of a minim and a half of a 5 per cent. emulsion, increased gradually with each injection.—Amer. Journ. Pharm., Dec., 1897, 646; from Therap. Monatshefte.

Salicylic Acid—A New Reagent.—According to Cenci a solution of zinc (5 Gm.) in nitric acid (30 Cc.) is a good reagent for salicylic acid. The reagent must be prepared carefully, it being necessary that all the zinc is dissolved. A few drops of this reagent added to a warm solution of the material containing salicylic acid produces a violet coloration. On boiling, the color becomes wine-red. Sodium salicylate gives the violet reaction when cold. The delicacy of this reaction is said to be such as to detect one part of the acid in 60,000 parts of solution.—Amer. Drugg., Jan. 10, 1898, 6; from Al Policlinico, Suppl., *31*, 25.

Salicylic Acid—Detection in Canned Tomatoes.—According to Griggi the coloring matter of tomatoes, solanorubrin, interferes with the usual reaction for salicylic acid. He therefore recommends the treatment of 1 Gm. of the preserved fruit with 10 Cc. of petroleum ether in a test tube. The latter is drawn off with a pipette and treated in another test tube with a sodium hydrate solution of 0.5 to 1 per cent., which dissolves the salicylic acid, while the coloring matter remains in the petroleum ether. If the sodium hydrate solution is sufficiently weak, the identification with ferric chloride can now be carried out. The solanorubrin thus obtained gives a blue coloration with concentrated sulphuric and hydrochloric acids; it is decolorized by nitric acid; it does not change with acetic acid, or with potassium and sodium hydrate.—Pharm. Centralh., *38*, 168.

Saliformin—A New Antilithic.—The compound to which the name saliformin has been given is described as being a white crystalline powder, readily soluble in water and in alcohol, of an agreeably acid taste, and of the composition represented by the formula, $C_6H_{12}N_4.C_6H_4.OH.COOH$. Owing to the solvent action on urates and uric acid, and its antiseptic properties, it is recommended for use in the treatment of various affections of the bladder and urinary passages, such as cystitis, with ammoniacal fermentation. It may with advantage replace urotropine. It is given in doses of 1 to 2 Gm. daily, taken in one dose, dissolved in water.—Nou veaux Remèdes, xiii, 527.

Salitannol—A Condensation Product of Salicylic Acid and Gallic Acid. Under the name of salitannol a new condensation product obtained by the action of phosphorus oxychloride on a mixture of molecular quantities of salicylic and gallic acids, is described in "Pharm. Zeit. f. Russl" (xxxvi., 696). The new product has the composition $C_{14}H_{11}O_7$. It forms a white amorphous powder which is insoluble in water, ether, chloroform, benzene, and scarcely soluble in alcohol. It is insoluble in the cold in alkali carbonates, readily soluble, however, in caustic alkalies, but is extracted again from the solution by acids. It melts and decomposes at 210° C. Salitannol is used as an antiseptic remedy for wounds, and is said to combine the antiseptic properties of salicylic acid, gallic acid, and tannin.

Saccharine—Condensation Product with Resorcin.—P. Sisley finds that saccharine and resorcin heated together with sulphuric acid give a yellowish brown viscous mass. After cooling and throwing into water, yellow-brown crystals are formed; they are soluble in alcohol and acetic acid, but not in ether or chloroform, and they do not contain nitrogen. Its alkaline salts are very soluble, and possess a beautiful green dichroism; they dye silk in the same way as uranine. Analysis shows it to be identical with the sulphon-fluoresceïne of Remsen. When treated with bromine in alcoholic solution it easily gives a brominated derivative forming red crystals. slightly soluble in water, and soluble in the alkalies, forming a red solution with a yellow fluorescence—Chem. News, Dec. 24, 1897, 314: from Bull. Soc. Chim., 1897, No. 17.

Euphthalmin—A Derivative of Amygdalic Acid.—Dr. Vossius calls attention to "euphthalmin," a derivative of amygdalic acid, as a valuable aid to ophthalmoscopic examination. It produces mydriasis in the course of 20 to 30 minutes when 2 or 3 drops of a 2 per cent. solution are employed, the mydriatic effects disappearing completely in the course of 2 or 3 hours. Its use is not attended by pain or other untoward effects, and the accommodation remains unimpaired.—Pharm. Centralh., Sept. 23, 1897, 623: from Deutsch. Med. Wochenschr. 1897 (supplement), No. 25.

Oxidized Chrysarobin—A New Dermatological Preparation.—In consequence of the good results obtained with oxidized pyrogallol (pyraloxin) previously introduced by him, Dr. Unna was led to seek an oxidized chrysarobin, and obtained this preparation by the action of sodium peroxide on chrysarobin suspended in water. It is a brownish black substance, which is indicated in all cases where chrysarobin is contra-indicated, on account of its vigorous action—such as facial eczema, eczema of the genitals, and rosacea. It has no effect on psoriatic or dry eczematic efflorescences, as has chrysarobin.—Merck's Report, March 1, 1898, 139.

Eurobin—A Preparation of Chrysarobin.—According to Dr. Kromayer, eurobin is the "acetate" of chrysarobin, and an excellent substitute for the latter body, being soluble and free from toxicity. It is used in 2 to 3 per cent. solutions.—Pharm. Centralh., June 30, 1898, 476; from Münch. Med. Wochensch., 1898, 795.

Citric Acid—Manufacture in California.—The "Chem. Trade Journ." (Oct. 2, 1897), calls attention to the interesting fact that a factory for the manufacture of citric acid and oil of lemon has been established in San Diego, Cal. The factory has steam works, and has a capacity of 40,000 lemons a week. It takes from 60 to 70 pounds of juice to make 1 pound of citric acid.—Amer. Journ. Pharm., Dec., 1897, 646.

Calcium Citrate—Valuation.—A. Soldaini and E. Berté call attention to the confusion arising in the valuation of calcium citrate, owing to the acceptance by some chemists of the molecular weight of citric acid crystallized with half a molecule of water (=201), and by others with one molecule of water (=210). Calcium citrate is an industrial product of great importance in Sicily, where factories for its production are continually on the increase. It contains from 64 to 70 per cent. of crystallizable citric acid, and is much more convenient for exportation than concentrated lemon juice. It is important, therefore, that a uniform method of analysis should be agreed on by all chemists. There are two methods indicated in literature, viz., the lime method and the lead method, which do not give identical results, as the lead gives generally from ½ to 1 per cent. higher than the other. The authors have experimented with both methods, and find that the lime method deserves preference for quickness of results, but that it is necessary to settle the precise way and the quantity of the hot-water washings if it is desired to give uniform results, discrepancies of as much as 2 per cent., more or less, being possible even in the case of analyses made by one and the same chemist. The lead method, though much more tedious and expensive, has the advantage of greater exactitude. In any case, the analyses should be conducted on material dried in a water-oven, and the loss of water stated, while the certificate of results obtained should indicate the method followed. An analysis of pure calcium citrate prepared by the authors agrees with the formula $Ca_3(C_6H_5O_7)_2,4H_2O$. It loses 2 mol. of water at 115°–125° C., and the other two at 186°–195° C. The salt is quite hygroscopic.—Chem. & Drugg., June 4, 1898, 924.

Lithium Citrate—Presence of Water of Crystallization.—J. F. Woolsey observes that the U. S. P. takes no cognizance of the water of crystallization contained in lithium citrate, giving the molecular formula and weight as $Li_3C_6H_5O_7=209.57$. But this salt appears to contain four molecules of water. It loses three molecules of this water when heated to from 100° to 105° C. When the Pharmacopœia refers to the "dry" salt without mentioning the temperature at which it is to be dried, one might be in doubt as to whether anhydrous salt, or salt with one molecule of water, or that with four molecules of water, is intended. A salt dried at 105° might be condemned because of the difference in the amount of normal sulphuric acid required in titrating. The molecular weight of lithium citrate with four molecules of water of crystallization would be 282. One gram of such a salt would, after ignition, require 10.6 cubic centimeters of normal sulphuric acid; but one gram of anhydrous lithium citrate after ignition would require 14.27 cubic centimeters normal sulphuric acid, to neutralize the carbonate. Experimentally the author found that one gram of dry salt containing its water of crystallization yielded upon ignition an amount of lithium carbonate requiring from 10 to 10.5 cubic centimeters of normal sulphuric acid for neutralization.—Bull. Pharm., Aug. 1897, 344.

Silver Citrate and Lactate—Antiseptic Value.—The "Pharm. Centralh." calls attention to the superior antiseptic value of certain silver salts of organic acids, which, while being as powerful germicides as corrosive sublimate, are practically non-toxic. They are silver citrates introduced under the name of *Itrol*, and silver lactate, known as *Actrol*. For convenience, they may be prepared in tablets similar to sublimate tablets, containing 10 centigrammes of itrol or 20 centigrammes of actrol, and they are recommended for all the antiseptic purposes for which corrosive sublimate is usually employed—for gauzes, cottons, silk, cat-gut, drains, and the like. The only drawback to the use of these silver antiseptics is that they may give rise to stains in the linen; but these may be readily removed by soaking the spots for a few minutes in a solution of mercuric chloride, 10; salt, 25; water, 2000; and then rubbing well in pure water.—Nouv. Rem., 1897, 562.

Citrates, Tartrates, Glycerin, etc.—Interference by Their Presence with some Common Chemical Reactions.—E. A. Ruddiman records the results of some experiments made to determine the effect of citrates, tartrates, glycerin, sugar and acacia in preventing the forming of precipitates in metallic salts by reactions commonly employed. The salts experimented upon were: alum, calcium hypophosphite, chromic sulphate, copper sulphate, ferric chloride, ferrous sulphate, lead acetate, magnesium sulphate, mercuric chloride, tartar emetic, and zinc sulphate. The results are that in nearly every case they interfere or prevent the precipitation by alkali hydrates, carbonates, phosphates and sulphides, in which such are formed under ordinary conditions, though this prevention may not be shared by all alike, and in other cases may only be due to one or more of them individually, but not by all. To illustrate: the precipitation of alum as aluminum hydrate, carbonate and sulphide is prevented by all of them, as is also the formation of a precipitate in dilute solution of alum by borax; but the precipitation by sodium phosphate is prevented only by citrates and tartrates, and not by either sugar or glycerin. The precipitation produced under ordinary conditions in solution of calcium hypophosphite by sodium and potassium hydrate, and by borax, is prevented by all of them, while sodium phosphate precipitates the calcium salt in the presence of glycerin, sugar and acacia, but not in the presence of citrates or tartrates, etc., etc.—Proc. Tenn. State Drugg. Assoc., 1897, 28–30.

Ammonium Tartrate and Citrate—Method of Removing Lead and Copper..—L. de Koningh observes that in certain analytical operations it is essential that the ammonium citrate or tartrate used should be absolutely free from either lead or copper. By simple crystallization, with observance of the greatest care, he was unable to remove these metals, but he succeeded well by adopting a process which is based upon Egeling's process for detecting traces of lead in water. To the solution of the contaminated ammonium citrate or tartrate, which should be strongly alkaline, a little strong hydrogen sulphide is cautiously added until the color does not get any darker; a little kaolin is then added, and the whole well stirred until it has combined with the sulphides. The liquid is now filtered, and should at once be used for the comparison test. If the filtrate is yellowish, this may be remedied by agitating with purified animal charcoal. The filtrate should then once more be tested with hydrogen sulphide and, if necessary, be again shaken with kaolin.—Chem. News. March 18, 1898, 119.

Tartaric Acid—Determination in Argols, etc.—J. von Moszezenski states that by the method of Goldberg for determining tartaric acid, the cream of tartar upon which the final estimation depends must be contaminated with those impurities—particularly pectinic matter—in the original sample that are soluble in dilute hydrochloric acid, and not afterward thrown down in the presence of tartaric acid by boiling with potassium carbonate, or removed by the final washing with strong alcohol. The author recommends, therefore, the following method, which is free from the objections named, and yields satisfactory results: The wine lees, argol, or other substance containing tartaric acid, is first treated with sulphuric acid (10 to 15 per cent.), avoiding unnecessary excess. After remaining sufficiently long in contact with the acid, alcohol is added, the alcohol taking up all the tartaric acid and free sulphuric acid present. A portion of this alcoholic solution is then filtered off and potassium acetate added to it, which removes the sulphuric acid in the form of potassium sulphate and the tartaric acid as potassium bitartrate. The mixed precipitate is now collected, washed with strong alcohol and titrated. It is very important not to allow the alcoholic solution containing free sulphuric and tartaric acid to stand too long, since ethylated tartaric acid might be formed, which would affect the results, the latter being incapable of conversion into potassium bitartrate. The alcoholic solution is transferred to a porcelain dish; alcoholic solution of potassium acetate is added in sufficient amount and the whole well stirred. To reduce the solubility in alcohol of the cream of tartar thus formed, it will be found advantageous to add 5 Cc. of concentrated solution of potassium chloride. Working with argols or lees, it is easy to find the point when enough potassium acetate has been added by observing the change of color from pure red to pale-bluish red. If it is desirable to determine whether sufficient potassium acetate has been added, a little of the supernatant liquid may be poured into a test tube, and a few drops of potassium acetate solution added. If no precipitate is thrown down, it is an indication that the required amount of potassium acetate has been used. Cream of tartar is slightly soluble in alcohol, and allowance must be made for this in calculating results. When 5 Gm. of substance are used in 250 Cc. of 90 per cent. alcohol, the loss amounts to 0.3 per cent. tartaric acid, which should be added to the result.—Amer. Drugg., March 10, 1898, 128.

Sodium Arsenio-Tartrate—Preparation and Utility.—In the course of an investigation into the reaction which takes place between acidic oxides and the alkali salts of hydroxy acids, Prof. G. G. Henderson prepared several compounds similar in type to tartar emetic, but containing arsenic in place of antimony. Some of these compounds dissolve in water easily without undergoing decomposition, and may, therefore, prove of some value in the administration of arsenic medicinally. Thus, arsenous oxide dissolves readily in hot aqueous solutions of sodium hydrogen tartrate, with the result that sodium arsenio-tartrate—$AsO.NaC_4H_4O_6.2\frac{1}{2}H_2O$—is formed. To prepare it 100 parts of finely-powdered arsenous oxide are added, in small portions, to a boiling solution of 192 parts of crystallized sodium hydrogen tartrate. After all the oxide is dissolved, the solution is boiled for about fifteen minutes longer, then filtered and concentrated to small bulk on a water-bath. The delicate silky needles which crystallize on cooling are recrystallized from water (or from dilute 50 per cent. alcohol) and drained finally by the filter pump, forming groups of colorless prisms from watery and colorless plates from alcoholic solution. The salt is quite stable in the solid state, may be heated to nearly 200° C. without undergoing decomposition, losing, however, its water of crystallization at 105° C. It has a sweet but not unpleasant taste, an acid reaction, and being easily soluble in water, without decomposition, would seem to serve a good purpose for preparing "Liquor arsenicalis" and similar arsenical solutions, 1 Gm. being equivalent to 0.3225 Gm. of arsenous oxide. Corresponding ammonium and potassium salts can be prepared in a similar manner, but the sodium salt has several advantages over these.

Ammonium Arsenio-Tartrate crystallizes in small lustrous needles which are readily soluble in water. When kept for some time the crystals lose their transparancy and begin to crumble down, and if then heated with water are found to be decomposed to some extent.

Potassium Arsenio-Tartrate is obtained with greater difficulty than the others. It is a white crystalline powder, and is decomposed into arsenous oxide and potassium hydrogen tartrate when it is attempted to dissolve it in water. Similar compounds are obtainable also by the action of antimonous and arsenous oxide on salts of other hydroxy-acids, for example antimonio and arsenio-citrates. Both of these oxides form colorless, crystalline and easily soluble salts with the primary citrates of sodium, potassium and ammonium, some of which possess considerable stability, while others are easily decomposed by water.—Trans. Brit. Pharm. Conf. (Yearbook of Pharmacy), 1897, 381–383.

Alsol—An Aceto-Tartrate of Aluminum.—According to "Pharm. Centralh." (Feb. 10, 1898) the antiseptic compound introduced under the name of "alsol" as a non-poisonous substitute for potassium chlorate, carbolic acid and mercuric chloride, is an aceto-tartrate of aluminum, and according to the patented process is made by dissolving 5 parts of basic aluminum acetate by the aid of 2 parts of tartaric acid in water, and evaporating the solution to dryness. It may also be precipitated from its concentrated aqueous solution by alcohol, the product so obtained having the same composition as that obtained by direct evaporation. Its solutions react acid. When used medicinally as gargle, a little glycerin or sugar should be added to the solutions containing 0.5 to 1 per cent. of the medicament.

Picric Acid—Rapid Preparation af a Saturated Solution.—The preparation of a saturated solution of picric acid, which is often required quickly for application to burns, when conducted in the ordinary way takes time, but is accomplished rapidly, according to Sochaczewski, by the following method: Picric acid, 10; ether, 20; warm distilled water, 500. Dissolve the acid in the ether and pour into the warm water with constant stirring; the ether is quickly volatilized and leaves a supersaturated solution, 1 in 10, of picric acid.—Pharm. Journ., May 21, 1898, 5040; from Petit Monit. de Pharm., 47, 2613.

Picric Acid—Precaution in its Use as a Surgical Dressing.—In a communication to the Société de Chirurgie de Paris, Dr. La Touche warns against the indiscriminate use of dressings of saturated solution of picric acid in the treatment of burns. He has observed serious symptoms of poisoning, vomiting, colic, dysentery, and tendency to jaundice, following the application of this solution, while others present at the meeting confirmed these unfavorable results.—Pharm. Journ., Mar. 26, 1898, 302; from Répert de Pharm. (3), x., 83.

Picric Acid—Local Use in Acute Eczema.– Gaucher has found an application of a 1 per cent. solution of picric acid to be very useful in the treatment of acute vesicular eczema, the irritation being rapidly allayed by its use. The diseased part is painted with the solution, then covered with cheese-cloth soaked in the same, and this application repeated every second day.—Pharm. Journ., Sept. 25, 1897, 294; from La Presse Médic., through Brit. Journ. Dermatol., ix., 298.

Tuberculinic Acid—A Constitutent of the Tubercle Bacillus.—E. A. de Schweinitz and M. Dorset describe a crystalline acid, having the formula of teraconic acid, $C_7H_{10}O_4$, which they have isolated from artificial cultures of the tubercle bacillus, and have named provisionally tuberculinic acid. The new acid melts at 161° to 164° C., is readily soluble in water, alcohol or ether, and separates from its solutions in acicular or prismatic needles having a slight yellow tint. The acid appears to be responsible for the coagulation necrosis of tissues which appears to be a necessary accompaniment of the progress of tuberculosis. So far as determined the solutions of the acid exert some slight bactericidal action, but further experiments are necessary to prove its relation to teraconic acid as well as to determine its immunizing effects.—Journ. Amer. Chem. Soc., 1897, 782.

Tannin.—Percentage in the bark of various species of *Castanopsis*, which see under "Materia Medica."

Tannin—Function in Fruits.—C. Garber has made a study of the function of tannin in plants and especially in fruits. He concludes that in the respiration of soft fruits containing tannin, the volume of the carbonic anhydride evolved is less than that of the oxygen absorbed so long as any tannin remains unaltered. As soon as the tannin has disappeared, pectin is produced. If the temperature is so low that the cellular activity is not great, the respiration quotient remains lower than unity; but if the temperature is so high that the cellular activity requires more energy than is furnished by the free oxygen, the cellules obtain the necessary energy from the alcoholic fermentation of the sugars, the carbonic anhydride produced by it being added to that produced by respiration, and thus giving a quotient higher than unity. It follows that one of the principal functions of tannin in fruits is to prevent pectic transformations, and thus check the fermentation of the sugars.—Amer. Journ. Pharm., Dec. 1897, 642; from Compt. rend., 1897, *124*, 1106–1109.

Tannin—Optical Behavior.—T. Walden has investigated the optical behavior of tannin. His observations convince him that tannin is not a simple body, but a mixture, which under different processes yielded fractions of higher rotatory power in some, and of lower power in others, in which for the original value $(a)_D=+67.50$, the values $(a)_D=21°$ to $+75°$ are obtained. A comparison of two representative samples proved that commercial tannin is not even a constant mixture, the two preparations exhibiting a wide divergence in their activity in water, as well as in their behavior to acetic ether.—Pharm. Ztg., Feb. 2, 1898, 82; from Ztschr. f. Angew. Chem.

Caffetannic Acid—Constitutional Formula.—Since the investigations of Hlasiwetz, caffetannic acid has been usually regarded as having the formula $C_{15}H_{18}O_8$, but Paul Cazeneuve and E. Hadden, from a recent study of the behavior of the substance toward phenylhydrazine, conclude that it has the composition $C_{21}H_{28}O_{14}$, and they ascribe to it the constitutional formula $COOH.CH.CH.C_6H_3(O.C_6H_{11}O_5)_2$. The *osazone* of caffetannic acid, $C_{45}H_{48}N_8O_{10}$, crystallizes in yellow needles, is very sparingly soluble in alcohol, insoluble in most media, and so sparingly soluble in phenol and naphthalene that no determination of molecular weight has been possible. It melts at 180°. The *sugar* obtained on hydrolyzing caffetannic acid has the composition $C_6H_{12}O_6$.—Amer. Journ. Pharm., Dec. 1897, 640; from Compt. rend., 1897, *4*, 1458–1460.

Caffetannic Acid (*Glucosylcaffeic Acid—Products of Decomposition.*—Hermann Kunz-Krause finds that caffetannic acid, as well as matétannic acid, when hydrolyzed, yields a syrupy sugar and

Caffeic Acid (*Dihydroxycinnamic Acid*).—This acid, when heated at 200°, readily loses carbonic anhydride, yielding

Vinylcatechol (*3 : 4-dihydroxycinnamene*), the decomposition at this temperature being quantitative. This, as well as its ethers, give a carmine-red coloration with sulphuric acid, which appears to be characteristic for these compounds. Vinylcatechol was obtained only in form of an amorphous powder. It is a somewhat unstable substance, for when distilled under a pressure of 12 millimeters it is decomposed, the chief product being catechol. The author thinks it probable that caffetannic acid is distributed throughout the vegetable kingdom in very much the same manner as choline.—Amer. Journ. Pharm., Dec., 1897, 641; from Ber., 1897, *30*, 1617–1622.

Tannon—A New Intestinal Astringent.—K. Hock has introduced a condensation product of tannin and urotropine (hexamethylenetetramine), under the name of tannon, as an intestinal astringent. Upon mixing the aqueous solutions of these two substances, a white precipitate is formed, slightly soluble in water or alcohol, and having an astringent taste. It loses these objectionable properties when slowly heated to 100° C., or when heated for some time with water or glycerin. Depending upon the proportions of the constituents used, the final product will contain from 3 to 6 molecules of tannin to one of urotropine.—Apoth. Ztg., 1898, 59.

Dr. Schreiber calls attention to "tannon." He states that it contains 87 per cent. of tannin and 13 per cent. of urotropine, is a light-brown, tasteless powder, and is almost insoluble in water, weak acids, alcohol and ether, but dissolves slowly in weak alkalies. It is recommended as being useful in affections of the intestines, in doses of 1 Gm. three or four times a day for adults, and 20 = 50 centigrammes to children.—Pharm. Zeit., 1897, 828.

Captol—A Condensation Product of Tannin and Chloral.—Under the name of "captol," a condensation product of tannin and chloral is described in "Pharm. Post" (1898, 521). It is a dark-brown powder, and is used as a medical cosmetic for seborrhœa. A ½ per cent. alcoholic lotion is rubbed into the scalp morning and evening, the use of fats, pomades or soap being strictly avoided.

Suberic Acid—Characters.—According to C. Massol, suberic acid occurs in the form of brilliant, white, laminated crystals melting at 139.5°, and slightly soluble in cold water. It forms potassium suberate easily at the ordinary temperature. The neutral salt dried at 100° is anyhydrous, and easily dissolves in water. The acid potassium suberate is very little soluble in water; its heat of solution at about 40° is 5.26 calories, that of the neutral salt being 0.92 calories.—Chem. News, Oct. 8, 1897, 183; from Bull. Soc. Chim. de Paris, 1897, No. 15.

ORGANIC BASES.

Alkaloids—Various Methods of Detection.—The following method for the detection of alkaloids, collated from various sources, are given in "Zeitschr, f. anal. Chem.," 1898, 61:

As reagents for some alkaloids, A. L. Bronciner uses potassium sulphorutheniate (1 Gm. in 20 Cc. conc. H_2SO_4) and ammonium sulphouranate (1 Gm. in 20 Cc. conc. H_2SO_4), both of which give characteristic color reactions with many alkaloids.—Pharm. Ztschr. f. Russl. *28*, 778.

Veratrine.—According to G. Laves, three or four drops of a 1 per cent. solution of furfurol are mixed with 1 Cc. of concentrated sulphuric acid in a test tube and 3–5 drops of this mixture are poured carefully upon the substance to be tested. A dark-colored streak proves veratrine. On mixing, the liquid becomes dark green, after awhile blue and then violet.—Phar. Ztg., *37*, 338.

Colchicine.—According to E. Barillot, some colchicine is rubbed up with about 0.25 Gm. oxalic acid; 1 Cc. sulphuric acid is then added, and the mixture warmed on an oil bath in a small closed tube for about an hour to 120° C. On now adding water, the mixture becomes clear and assumes a yellow color. Alkali colors it red and careful acidulation changes this red color to pale yellow. Chloroform extracts from the mixture a yellow dye. On evaporating the chloroform, a yellow resinous residue is left which is colored reddish-violet by nitric acid (sp. gr. 1.4) and raspberry-red by concentrated sulphuric acid. Addition of potassium nitrate to the mixture colors it red, and this color soon changes to greenish-yellow. Ptomaines do not show this reaction.—Bull. Soc. Chim., 1897, 514.

Opium Alkaloids.—The application of heat is recommended by G. Bruylants in carrying out some reactions with the opium alkaloids, and a list is given by the author showing the different shades produced at ordinary temperature, as well as on heating. – Pharm. Centralh, *36*, 284.

Cocaine.—According to Sonnié-Moret, cocaine in toxicological researches is best detected by examining under the microscope the precipitates formed with gold chloride or picric acid.—Jour. de Pharm. et Chim., *27*, 390.

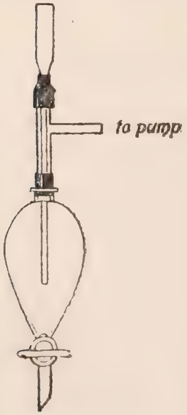
Cytisine.—In carrying out van de Moer's reaction for cytisine, K. Gorter finds the best proportions of the ingredients to be 0.2 Cc. of a 5 per cent. solution of ferric chloride and 5 Cc. of a 0.05 per cent. solution of hydrogen peroxide for every 7.74 mg. of cytisine. On warming this mixture with cytisine, a blue color appears even in the presence of only 0.05 mg. of cytisine. Other alkaloids do not show this reaction.—Arch. d. Pharm., 1897, 527.

Alkaloids—Determination in Tinctures and Extracts without Heat.—In order to avoid the decomposition of alkaloids by heat, J. Katz has devised the following method for their determination in tinctures and extracts: Agitate 25 Cc. of the tincture containing 45 per cent. of alcohol in a separator with 50 Cc. of ether and 1 Cc. of sodium hydrate solution, containing 33 per cent. NaOH. Decant the ether, and repeat the operation twice with 25 Cc. of ether containing 10 per cent. of alcohol. Agitate the united ether solutions with 2 or 3 Gm. of gypsum to remove water, and filter into a stoppered flask. Titrate the ether solution with centi-normal HCl, using iodeosin, in alcoholic solution, as indicator. In the case of alkaloids requiring chloroform as a solvent, such as strychnine for instance, a mixture of chloroform, 1 part, and ether, 3 parts, is used, the separation of the solvent from the aqueous layer being here accelerated by the addition of 2 or 3 Gm. of sodium chloride, and the chloroform ether solution is also washed with a solution of salt. Extracts are dissolved in 45 per cent. alcohol, and in the case of tinctures containing a higher percentage, water must be added to reduce them to the required alcoholic strength. If they contain chlorophyll, this must be filtered off after dilution with water and acidulation, before carrying out the described process.—Pharm. Ztg., 1898, 273.

Alkaloids—Method of Assay in Tinctures.—Clarence A. Seyler, in his paper on the strength of commercial *alkaloidal tinctures* (which see under "Pharmacy"), recommends the following method of assay (modified from methods heretofore described by Farr and Wright): *A.* From 10 to 100 Cc. of the tincture are evaporated to drive off alcohol, and the original volume is restored by water. *B.* To the cool liquor 1 Cc. of semi-normal acid is added, filtered into a separator through cotton, and shaken with consecutive portions of 10, 5 and 5 Cc. of chloroform until this is separated colorless. *C.* The colored chloroform from this acid liquor is then washed with three portions of acidified water (20 Cc. of water and 2 Cc. semi-normal acid) and the washings are added to the acid liquor, *B*, previously obtained. *D.* To the so purified aqueous liquor, 2 Cc. of liquor ammoniæ, B. P., are added, and it is shaken out with consecutive portions (of 10, 5 and 5 Cc.) of chloroform, until this, on evaporation, gives no precipitate with Mayer's reagent. *E.* The chloroformic solution of crude alkaloid so obtained is now shaken out with three portions of acidified water as under *C*, 2 Cc. of liquor ammoniæ added to the acid solution of alkaloids so obtained, and it is then shaken out with (10, 5 and 5 Cc.) chloroform, as under *D.*, the chloroformic solution is evaporated, and the residue weighed and titrated as *pure alkaloid.*

In order to carry out the assay successfully, it is important that the agitation with chloroform should be very vigorous and thorough, and this cannot be done without the formation of those obstinate emulsions which render the process so tedious. In order to overcome this difficulty, the author has employed and strongly recommends the filtration of the emulsion through a layer of about 2 to 4 centimeters of tightly-packed cotton by means of a filter-pump, as suggested by Platt in the Journal of the Amer. Chem. Soc., and for this purpose he has found the apparatus shown in the accompanying cut (Fig. 88) very practical.

FIG. 88.



The filter is made of a piece of combustion tubing, drawn out into a long tube about the thickness of a knitting-needle. A tap separator is fitted with a cork through which a glass T-tube passes, the horizontal limb of which is connected with the pump, while the filter tube passes through the vertical limb into the separator, connection being made by a piece of rubber tubing. The pump should be fitted with a three-way tap, by means of which, by a single motion, the interior of the separator may be connected with the exhaust or with the outer air. The emulsion is gently sucked through the filter, when it separates into two clear layers, the lower of which is chloroform, and can be cleanly tapped off.—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1898, 420-426.

Alkaloidal Assay—Process Applicable to Kola, Guarana and Coffee.—Charles H. La Wall recommends the following process for the assay of kola, guarana and coffee, as being simple and efficient. Into a separatory funnel place 5 Gm. of the drug and 5 Cc. of 10 per cent. ammonia water. Allow the mixture to stand for thirty minutes, then shake out the alkaloids with chloroform, using three portions of 20 Cc. of each. If emulsification occurs, add powdered magnesium carbonate in small quantities until separation takes place. The chloroform washings yield a residue, when distilled in a tared flask, which is composed of fat and alkaloid; from this mixture the fat may be completely removed by washing with successive fractions of 20 Cc. of ether, until no perceptible residue remains upon evaporation of a small quantity. With care, the ether can be decanted without loss of alkaloid; but as a precautionary means it may be passed through a filter, which, after washing with ether, is washed with chloroform, the chloroform washings being added to the alkaloid in flask and, after distillation, the total weight of alkaloid ascertained. This simple process avoids the use of a Soxhlet extraction apparatus, and is equally accurate. Thus kola nuts yielded 1.39 per cent. of caffeine on extraction with chloroform in a Soxhlet apparatus, and in four samples by the simplified process 1.37, 1.40, 1.43 and 1.48 per cent. respectively. Similarly a yield of 4.32 per cent. of alkaloid was obtained from guarana by Soxhlet extraction, while by the author's process 4.62 and 4.68 per cent. were obtained.—Proc. Penna. Pharm. Assoc., 1897, 74.

Alkyl Bismuth Iodides—A Distinct Class of Compounds.—Prof. Albert B. Prescott records the results of some studies upon the bismuth iodides of organic nitrogen bases, which prove them to constitute a distinct class of compounds, with marked physical properties and a constitution of much chemical interest. The common alkyl ammonium iodides give with solutions of bismuth salts bright-colored precipitates. As formed by quarternary methyl or ethyl ammonium iodide, the color is orange-yellow in most cases, lighter in color when obtained with bismuth chloride, darker when obtained with bismuth nitrate. When fully formed by excess of the organic iodide, in bismuth solution not strongly acid, the precipitation is amorphous, and so nearly complete that when the filtrate from a test-tube portion is evaporated to dryness and the residue ignited and treated with solvent acid, hydrogen sulphide fails to blacken the liquid. In the course of his present study, the tetramethyl- and the pyridine-ammon-bismuth iodides were prepared and their constitutional formulas ascertained.

Tetramethyl-ammon-bismuth iodide, crystallized from hydrochloric acid of sp. gr. 1.19 diluted with an equal measure of water, has the composition $N_3(CH_3)_{11}HBi_2I_7$.

Pyridine-ammon-bismuth iodide, crystallized from alcohol, has the composition $(C_5H_5N)_3(HI)_3Bi_2I_6$, and is analogous to

Atropine bismuth iodide, $(C_{17}H_{23}NO_3)_3(HI)_3Bi_2I_6$. Both the amorphous and crystalline forms of these compounds are stable in the air, but they are not perfectly proof against decomposition by much water. They are sparingly soluble in ethyl or amyl alcohol, insoluble in glacial acetic acid, in ethyl ether, in chloroform, and in benzene. The tetramethyl compound remained constant in weight at 130°; the atropine compound melts, but at 98° holds constant weight.

The alkaloid bismuth iodides, which are produced under the conditions of Dragendorff's test, are not quantitatively uniform enough to be entirely satisfactory for alkaloidal assay, but are more stable and uniform than the alkaloid mercuric iodides formed by Mayer's reagent. On the other hand, they are more bulky, less easy to gather into compact mass, less manageable in filtration, and, on the whole, present no advantage over Mayer's reagent, notwithstanding the fact that the latter has been found unsatisfactory in the hands of analysts.—Pharm. Review, Nov., 1897, 219.

Morphine—Chemical Bibliography from 1875–1896.—In the "Pharmaceutical Review," October and November, 1897, and continued in the "Pharmaceutical Archives," January and February, 1898, both edited by Prof. Edward Kremers, will be found the reprint of a chemical bibliography of morphine covering the years 1875 to 1896. The arrangement of this work, which was undertaken by H. E. Brown under the direction of Prof. Albert B. Prescott for a Special Committee of Research of the American Pharmaceutical Association, is as far as possible chronological, and is provided with an index of authors and one of subjects. The chemical literature of morphine is especially difficult to compass, both as to analytical method and as to chemical structure, and this work will therefore be consulted with advantage by experimenters upon the subject.

Morphine—Suggestions to Improve the U. S. P. Method of Assay.—Frank X. Moerk, after experiments covering a number of years, suggests some improvements in manipulation, etc., which he thinks will assist in perfecting the U. S. P. process for assaying opium. The sample of opium is weighed and dried for about twelve hours at 80°–85° C.; drying being facilitated by cutting the samples into pieces about the size of cherries before weighing. The loss in weight is noted, and the partly-dried opium is coarsely powdered and thoroughly mixed; of this, 2 Gm. are taken for the residual moisture estimation, and 8 Gm. for the morphine estimation, according to the U. S. P. The latter quantity, as a rule, corresponds very closely to 10 Gm. of moist opium; the exact quantities of moist and perfectly dry opium are, however, to be calculated from the loss sustained in drying. This procedure enables a uniform sample from which concordant results can be obtained when assayed at some subsequent time, and calculated to opium containing the original quantity of moisture. In powdering the partly dried opium in glass or iron mortars, electricity is developed, and there is difficulty in avoiding loss from particles being thrown about; this phenomenon was not noticed when using wedgewood mortars.

The crude morphine obtained by the U. S. P. process was first weighed on counterbalanced filters, and again after transferring to a watch-glass. In the table accompanying the author's paper—which gives the results of opium examinations made from 1894 to 1897—it is shown that there is, in the majority of instances, a difference of a few milligrammes in the two weighings, which the author explains by the introduction of some of the fibre of the filter paper when the morphine is brushed off on to the watch-glass by means of a camel's-hair brush. The next, and a most important step, is to ascertain the amount of impurity in the crude morphine. For its determination several methods are in use, among them the solubility in lime water, the solubility in alcohol, and the method depending on the amount of ash obtained after incinerating the crude morphine. After reviewing the respective efficiency of these three methods, and considering the impurities that may be present in the crude morphine, the author decides in favor of the lime-water method, though none of them can be considered entirely satisfactory. Preference is given to the lime-water method because it involves less change during the manipulation, the ease of filtration, and the possibility of reprecipitating the morphine from its lime water solution as a check experiment. The method is carried out as follows:

Thoroughly moisten 0.5 Gm. of the well-mixed crude morphine with 5 Cc. of lime water in a flask, then add 45 Cc. more of lime water and rotate the contents of the flask repeatedly during half an hour. Filter the solution through counterbalanced filters (7 centimeters), rinsing the precipitate (undissolved portion) in the flask upon the filter by the use of small portions of the filter; wash the flask and filter with 5 Cc. of lime water in portions of 1 Cc. at a time, drain, set aside the filtrate and washings, and wash the filrate with 5 Cc. of distilled water applied in portions of 1 Cc; after again draining, press the filter between bibulous paper and dry to constant weight at 50°—55° C. This weight is calculated on the entire weight of crude morphine previously ascertained, and when subtracted from the weight of the latter as obtained on the watch-glass, the weight of *pure morphine* is obtained, which is then calculated to 100 parts of opium. The check experiment is made by adding to the lime water and washings 6 Cc. of ether—which renders the subsequent precipitation of the morphine easier—agitating thoroughly, adding 0.150 Gm. of ammonium chloride, continuing the agitation for 10 minutes, and setting aside for 10 to 12 hours, or over night. The precipitated *pure morphine* is collected on counterbalanced filters (7 centimeters) by the aid of small portions of the filtrate, washed with 15 Cc. of distilled water applied in portions of 1 Cc., drained, and then dried at 50°—55° C. to constant weight. The combined weight of the recovered morphine and of the correction for impurities previously ascertained, subtracted from 0.500, gives the loss sustained in the process of purification, and represents chiefly the morphine remaining dissolved in the 55 Cc. of mother-liquor.—Proc. Pennsylvania Pharm. Assoc., 1897, 65–71.

Morphine—Separation from Codeine.—Fouquet suggests that anisol be utilized for the quantitative separation of morphine and codeine. The solubility of these two alkaloids is very different in that substance, that of codeine being, in 100 parts of the solvent, 7.8 at 9°, 15.28 at 16°, and 164 at 100°. A mixture of 1.044 Gm. of codeine and 0.710 Gm. of morphine was examined with 20 Cc. of anisol, thrown on a filter, washed with another 10 Cc. of anisol, and the insoluble morphine dried and weighed. The weight found was 0.702, showing a loss of morphine of 1.026 per cent. —Pharm. Journ., Aug. 21, 1897, 186; from Journ. de Pharm., 1897 (6), v., 49.

Apomorphine—Emetic Action.—The experiments made by Guinard to throw some light on the emetic action of apomorphine have given some interesting results. He found that certain animals, such as pigs, are uninfluenced by the drug. With dogs and cats it readily gives rise to vomiting, but large doses are less effective than small or medium ones. With massive doses the nervous centres which control vomiting become paralyzed and no emesis results. In the condition of asphyxia, whether resulting from drowning or from carbonic acid gas suffocation, apomorphine is inert. This is an important fact, since the drug is sometimes injected in cases of drowning in the hope that the act of vomiting will start respiration. For this purpose it is useless. It is also found to be useless as an emetic when the patient is under the influence of morphine.—Pharm. Journ., Oct. 30, 1897, 378; from Répert de Pharm. (3), ix., 477.

Apomorphine Hydrochloride—Dosage and Expectorant Value.—In "Merck's Index," 1896, the doses of apomorphine hydrochloride are given as follows: Expectorant, $\frac{1}{64}$ to $\frac{1}{20}$ grain, in syrup; emetic, $\frac{1}{20}$ to $\frac{1}{8}$ grain; injected, as an emetic, $\frac{1}{15}$ to $\frac{1}{10}$ grain. This statement does not accord with the experience of Dr. Robert H. Babcock, who finds that when injected under the skin, $\frac{1}{10}$ to $\frac{1}{5}$ grain will generally produce prompt emesis, but that he has known complete failure to follow two injections of $\frac{1}{5}$ grain in the case of a patient moribund from pneumonia with extensive bronchitis. He finds, furthermore, that by the mouth a patient may take as much as 2 grains at a single dose without occassioning even nausea. He has discovered, however, that if even a small dose of apomorphine be combined with some other nauseating expectorant, such as ipecac or tartar emetic, it intensifies the action of the latter and readily occasions sickness and vomiting. He heartily recommends apomorphine as an expectorant, for which purpose it may be given in doses of ¼ grain, or even 1 grain, and believes it should be substituted for tartar emetic, ipecac and lobelia in ordinary cough mixtures. It cannot, however, be combined in such mixtures when potassium iodide is indicated, because of its incompatibility with the latter. It has been stated by Murell that apomorphine does not lose efficiency or develop deleterious properties on turning green. This is confirmed by his own experience with the remedy in hundreds of cases. He reiterates that physicians and pharmacists may cease to fear emetic effects when apomorphine is taken by the stomach.—Merck's Rep. June 15, 1898, 364.

Benzylmorphine—Formation and Character.—The compound "benzylmorphine—$C_{17}H_{18}NO_2.O.C_6H_5CH_2$—, is formed when morphine in the presence of an alkali and a diluent, such as alcohol, is acted on by benzyl chloride. The new compound crystallizes in large prisms, is readily soluble in alcohol, ether, benzene, etc., and does not give the blue color with ferric chloride so characteristic of morphine. It is said to be employed as a substitute for codeine, over which it is claimed to have certain advantages.—Pharm. Ztg., *42*, 448.

Codeine—Synthesis.—According to a recent German patent, codeine is made synthetically by the following process: Morphine, 285 Gm., and nitrosomethylurethane, 132 Gm , are dissolved in 1 kilo. of methyl alcohol. With the solution is mixed, constantly stirring, a solution of caustic potash, 50 Gm. in 800 Gm. of methyl alcohol. When the reaction is complete, the methyl alcohol is distilled off, and codeine is extracted from the residue with benzene, from which it afterwards separates in characteristic crystals. —Chem. and Drugg., Feb. 5, 1898, 237.

Quinine Sulphate—Critical Examination of the B. P. Test, 1898.—A. J. Cownley has subjected the test of the new British Pharmacopœia to critical examination, and finds that it will reveal only about one-half the amount of cinchonidine that may be present in a sample. He gives analytical figures which show that a sample of quinine sulphate answering the requirements of the Pharmacopœia, "should not yield more than 3 per cent. of crystals of impure cinchonidine," by the Pharmacopœia test, really means that quinine sulphate containing an admixture of 5.99 per cent. of crystallized cinchonidine sulphate would answer the requirements of the new British Pharmacopœia. As to results actually obtained, a sample from which 5.25 per cent. of impure cinchonidine crystals was obtainable by other tests, yielded to the new B. P. test only 47.2 per cent. of this quantity, thus leaving 52.8 per cent. unrevealed. In another case, 10.7 per cent. of cinchonidine crystals being present, the yield by the B. P. process was 51.8 per cent. of this quantity, and 48.2 per cent. was unrevealed.

Incidentally, also, the author mentions that the official directions prescribe methods of testing quinine sulphate for cinchonine, quinidine, and cupreine; alkaloids which are never present in quinine sulphate of any known commercial manufacturer. Moreover, cupreine is a rare alkaloid, met with only in the bark of *remijia pedunculata*, which at the present time is seldom, if ever, employed by quinine manufacturers, and in any case cupreine could only exist in quinine sulphate to the extent of a few hundredths per cent.—Pharm. Journ., April 30, 1898, 412.

Quinine Sulphate—Unreliability of Kubli's "Water Test."—Dr. Albert Weller, who has previously referred to the same subject, again calls attention to the unreliability of Kubli's "water test" (see Proc. 1897, p. 707), and maintains that it possesses no advantage over the ammonia test to establish the purity of quinine sulphate. Tests carried out by Kubli's method on one and the same sample of this salt will frequently yield different results. Even with pure quinine sulphate one test required 9.4 Cc., and another of the same sample 15.4 Cc. of water, showing a difference in the titration of 6 Cc. A sample of quinine sulphate required 15 Cc. by Kubli's test, whilst the same sulphate after twice recrystallizing from the water required 18.2 Cc., thus condemning the purer salt. By the ammonia test 9 to 10 Cc. were required before and 6 Cc. after these recrystallizations, this being in accordance with the evidence of purification. Dr. Weller, from the results of his investigations, agrees with Dr. Hesse that Kubli's water test is less reliable than the modified ammonia test, and that it is unsuitable for official purposes.—Pharm. Journ., July 3, 1897, 3; from Pharm. Ztg., 1897.

Quinine Sulphate—Commercial Quality.—For the purpose of ascertaining how quinine sulphate of the market conforms to the U. S. P. requirement, Francis Hemm examined five brands supplied in the original containers of representative manufacturers. According to the Pharmacopœia, one Gm. dried at 115° C. to constant weight should not weigh less than 0.838 Gm., showing a loss by this treatment of 8 molecules or about 16.18 per cent. of water. Under these conditions the samples lost respectively 10, 7.5, 12.5, 12.5, and 10 per cent., showing that none of them lost the limit—undoubtedly because they had already lost quite a portion of their original amount of water before they were subjected to the test. By the Kerner-Weller ammonia test, upon which the Pharmacopœia relies for the determination of an undue amount of other cinchona alkaloids present in quinine sulphate—which depends upon the fact that an aqueous solution of the sample saturated at 15° C. remains clear on the addition of aqua ammoniæ in certain proportions, the results were as follows: Nos. 1 and 3 formed a clear solution, Nos 2, 4 and 5 gave slight or small precipitates. They all proved to be sufficiently neutral to litmus, and by the sulphuric acid test were proven to be free from readily carbonizable organic impurities. They all responded approximately right in point of solubility in water. With one exception, they were beautifully crystalline, perfectly white, bulky and flocculent—the exception being more compact and not as handsome externallly. All were volatilized without leaving a residue upon ignition.

The result of a series of examinations by the pharmacopœial methods of ten commercial samples of quinine sulphate, embracing the product of almost every manufacturer that supplies the American market, is also reported by A. Brandenberger. The general properties of the samples conformed to those given in the Pharmacopœia. In their solubilities in cold and boiling water, and in alcohol, they differed from the pharmacopœial requirements in being more soluble. In three of the samples a slight trace of quinidine was noted. In the desiccation test the average weight of the residue was .855, and, with a single exception, they were all shown to contain less water of crystallization than required. Upon igniting, every sample left a residue of a black lustrous color, the average amount of residue being .186 out of 1 Gm. (? Rep.). An average of 10.89 per cent. of cinchonine and cinchonidine sulphate was found. Only one sample made a fair showing; the others failed to comply with all the requirements of the U. S. P.—Proc. Mo. Pharm. Assoc., 1897, pp. 78 and 96.

Quinine Hydrochloride — Use in Acute Nasal Catarrh.—Dr. Horn recommends a solution of 2 parts quinine hydrochloride in 180 parts of distilled water as an absolutely effective douche in cases of acute nasal catarrh.—Pharm. Ztschr. f. Russ. xxxvi., 97.

Quinine Nitroprusside—Utilization for the Detection of other Alkaloids in Quinine Sulphate.—It is stated by a writer in "Bull. de Soc. Chim." (1898, 45) that the compound formed on the addition of sodium nitroprusside to neutral solutions of quinine salts, is much less soluble in water than the compounds formed with the other cinchona alkaloids. This fact can be made use of for detecting traces of the other alkaloids in quinine sulphate. The quinine being precipitated with the nitroprusside, the filtrate will not give a precipitate with ammonia if the quinine salt is perfectly pure.—Pharm. Review, May, 1898, 191.

Quinine Glycerophosphates—Preparation.—Moncour obtains quinine glycero phosphate by neutralizing a titrated solution of glycerophosphoric acid with an equivalent quantity of quinine, or by double decomposition of solutions of a quinine salt and of calcium glycerophosphate in equivalent proportions. The compound obtained is the same by both methods, and is in form of fine white needles closely resembling quinine sulphate in appearance. It is inodorous and bitter, but not nearly so bitter as the sulphate. It is scarcely soluble in water or cold alcohol, but readily so in hot alcohol or glycerin, and becomes readily soluble by the addition of a small quantity of citric or hydrochloric acid. This new salt of quinine is not altered in its composition by the dilution of its solutions, nor by heat, but, different from other glycerophosphates, is a very stable body. It melts at 154° C. It is a basic salt, containing 1 mol. glycerophosphoric acid, 2 mol. quinine, and 4 mol. of water. Containing 72.64 per cent. of quinine, it is to be preferred to the neutral salt which contains only 59.1 per cent., while it possesses the advantage over quinine sulphate, which contains 74.31 per cent. of quinine, in being in a more easily assimilable condition.—Chem. News, June 24, 1898, 290; from Journ. de Pharm. et Chim., 1898, No. 8.

Quinine Glycerophosphates--Preparation of Basic and Neutral Compounds.—According to E. Fallieres, there are two quinine glycerophosphates—basic and neutral.

Basic Quinine Glyceroyhosphate may be obtained by dissolving 75.6 Gm. of quinine in 400 or 500 Cc. of ether, and mixing this solution with a solution of 17.2 Gm. of glycerophosphoric acid in 50 to 60 Gm. of 96 per cent. alcohol. An abundant white precipitate is thrown down, which is collected, washed with ether, and dried in the air.

Neutral Quinine Glycerophosphate is obtained in the same way, using 36 Gm. of quinine and 17 Gm. of the acid. The compound is precipitated in the form of small, yellowish needles, which when collected (washed and dried (? Rep.), form a yellowish crystalline powder. It is moist to the touch, and has a tendency to aggregate; hence, it should only be prescribed in the pilular form. For general use the basic salt is to be preferred.—Pharm. Journ., April 30, 1898, 410; from Annales de Pharm. (9), iv., 123.

Quinine Glycerophosphates—Characters of the Neutral and Basic Salts.—E. Fallières observes that quinine glycerophosphate, to which has been assigned the formula $C_3H_7O_2PO_4(C_{20}H_{24}N_2O_2)_2$, is described as small colorless crystals, in the form of needles, easily and completely soluble in warm water and in alcohol; it contains 68 per cent. of quinine. It should be noticed that this formula applies to an anhydrous salt. The author's experiments show that the crystallized salt contains from 7 to 10 molecules of water, according to the degree of saturation of the acid by one or two molecules of quinine. Theory foresees and experiment confirms the existence of two glycerophosphates of quinine, corresponding to the sulphates or hydrochlorides known, the basic and the neutral salt. Practically, the preparation of the *basic quinine glycerophosphate*, containing 2 molecules of quinine, cannot be carried out by the double decomposition of an alkali glycerophosphate and a salt of quinine. Like all the glycerophosphates, quinine glycerophosphate must be obtained by precipitation in a dehydrating agent in which it is insoluble, such as ether. By preparing it under these conditions, quinine glycerophosphate takes the form of a very white, light, crystalline powder, unchangeable when exposed to the air, easily soluble in water acidulated with glycerophosphoric acid, soluble in warm water, in strong alcohol in the cold or in dilute warm alcohol, and insoluble in ether. It contains 1 molecule of acid, 2 molecules of quinine, and 7 molecules of water. The *neutral quinine glycerophosphate*, $C_3H_7O_2PO_4,C_{20}H_{24}N_2O_2 + 10H_2O$, is a pale-yellow, crystalline powder, moist to the touch, having a horny appearance when deprived of part of its water of crystallization. It melts at 120° C. into a vitreous mass of a brownish color. It is easily prepared by the double decomposition of an alkali glycerophosphate and a neutral salt of quinine (sulphate or hydrochloride); but the prolonged washings necessary to rid it of the sulphates or chlorides partly decompose it. Both these glycerophosphates may be estimated by dissolving in a mixture of hot alcohol and water, adding a few drops of phenol phthalein and then a solution of decinormal potash, until the rose-color remains permanent.—Chem. News, June 24, 1898, 289; from Bull. Soc. de Pharm. de Bordeaux, Jan., 1898.

Quinine Chlorocarbonate—A Bitterless Compound.—A new quinine compound—quinine chlorocarbonate $C_{20}H_{24}N_2O_2O.Cl.CO$—is made under a German patent by allowing phosgene to act on anhydrous quinine. A crystalline mass is formed, washed with benzene and then digested with water to remove the quinine hydrochloride which is also formed. Quinine chlorcarbonate crystallizes from alcohol in fine colorless needles, m. p. 187° to 188° C.; it is less basic than quinine, and gives in solutions the thalleioquin reaction. It has no bitter taste.—Chem. & Drugg., July 3, 1897, 23.

Tasteless Quinine—Method of Production.—Zimmer & Co. have secured a patent (in Germany) for the preparation of the carbonic acid alkyl ester of quinine, which is produced when the chloroformic acid alkyl ester is caused to react with quinine, either in the anhydrous or hydrated condition, or also in presence of diluents. The compound is tasteless, strongly basic in its reaction, and devoid of chlorine. It forms delicate white needles, melting at 95° C., with difficulty soluble in water, but easily soluble in alcohol, ether and chloroform.

Tasteless Cinchonidine is obtained in the same manner and combination, the quinine being replaced by cinchonidine. Like the quinine compound, or ether, it has a strong alkaline reaction.—Pharm. Centralh., July 1, 1897, 420.

Guaiaquin (Quinine Guaiacol-bisulphonate)—Characters.—By the interaction of molecular weights of guaiacol sulphuric acid—made by treating crystalline guaiacol with concentrated sulphuric acid—and quinine alkaloid, a new compound, quinine guaiacol-bisulphonate, is obtained, which has received the trade name "guaiaquin." It occurs as a yellowish, acid, bitter solid, which is readily soluble in water, alcohol, and dilute acid, and is offered as an efficient substitute for guaiacol, over which it has the advantage in being odorless and free from caustic effects. — Merck's Rep., July 1, 1897, 402.

Chinopyrine—A Compound of Quinine and Antipyrine.—G. Santesson recommends for subcutaneous use a 50 per cent. solution of quinine and antipyrine, which he has introduced under the name "chinopyrine." The quantity of water employed for this purpose is scarcely sufficient to moisten the mixed powders, but upon warming, the mass melts and forms a clear, syrupy, nearly colorless liquid, which is permanent. Upon evaporation, a non-crystalline varnish-like mass remains. The antipyrine appears to act as a solvent. Indeed, the author inclines to the opinion that the change is a chemical one, since, upon mixing the dry substance in powder, and exposing the mixture to the temperature of the water-bath in a test tube, a clear, colorless, tough mass is formed, which shows no evidence of crystallization on cooling. The combination of quinine and antipyrine in concentrated solution is, however, not original with Santesson, since Laverau had previously employed subcutaneously a solution containing 30 per cent. of quinine and 20 per cent. of antipyrine. The clinical observations made by both authors agree in that the subcutaneous injection of the solution in no case causes pain, inflammation, abscesses, or similar untoward results. —Pharm. Ztg., 1897, 623; from D. Med. Wochenschr., 1897, No. 35.

Chinoval—Compound of Quinine and Chloral.—A German apothecary has introduced an oily compound of quinine and chloral, under the name of chinoval, as an antiseptic, which is said to be equal in power to mercuric chloride.—Chem. & Drugg., Jan. 15, 1898, 91.

Quinidine—Identification by Means of the Microscope.—Vreven states that quinidine can be distinguished from other cinchona alkaloids by the form of the microscopic crystals which are yielded by Marme's reagent (potassio-cadmic iodide) in a solution of the salt or salts. Under the microscope the fine precipitate from the quinidine is found to consist of bushes of fine needle-crystals, quite different from those of quinine, cinchonine, and cinchonidine.—Chem. & Drugg., March 5, 1898, 400; from Chem. Ztg.

Hydrocinchonine—Further Studies of its Character.—Dr. O. Hesse has subjected hydrocinchonine, originally obtained by Caventou and Willm by oxidation of commercial cinchonine sulphate with potassium permanganate, to further investigation. It has previously been pointed out that hydrocinchonine exists naturally with cinchonine, from which it can be separated in several ways; but Dr. Hesse finds that it exists in relatively larger quantity in the cinchonine from *remijia purdicana*, in which the two mixed bases are best separated by converting them into platinum salts in a very slightly acid solution, so that the excess of hydrochloric acid does not exceed ¼ molecule HCl, and removing the flocculent hydrocinchonine salt from the granular platinum salt of cinchonine. Hydrocinchonine was then obtained by treating the platinum salt with ammonia and recrystallizing from hot alcohol. Hydrocinchonine melts at 268° to 269° C., and has a rotatory power of $[\alpha]_D = + 204.5°$ in absolute alcohol at 15° C. The sulphate $(C_{19}H_{24}N_2O)_2H_2SO_4.12H_2O$, and sulphates containing 9, 6, or 2 molecules of water have been obtained. They all lose the water of crystallization at 100° to 120° C. Hydrocinchonine sulphonic acid, $C_{19}H_{23}N_2O,SO_3H,H_2O$ was obtained by dissolving hydrocinchonine in sulpuric acid (1.84 specific gravity), allowing to stand 48 hours, adding water, and nearly neutralizing with ammonia. The greater part of the sulphonic acid separates out, and can be recrystallized from boiling water. Dr. Hesse differs in several instances from Skraup's work on hydrocinchonine, and also objects to Skraup substituting the name "cinchotine" for that body.—Liebig's Annalen, 1898, 42.

Cocaine Hydrochloride—Insufficiency of Maclagan's Ammonia Test.—Dr. Fritz Günther calls attention to criticisms made by Dr. Vulpius in 1889 concerning the so-called ammonia test of Maclagan, to the effect that only a few samples of cocaine will conform to the test, and that even these will not always respond to it; that the nature of the impurities in the sample, which by their presence prevent the reaction, is not known; and that, as a matter of fact, there has been no occasion for complaint by physicians with regard to cocaine, which, having responded to the permanganate and the sulphuric acid tests, failed to respond to the ammonia test of Maclagan. This test, having in recent years again been prominently mentioned as being reliable, Dr. Günther has made a series of experiments, the results of which convince him that the opinions expressed by Dr. Vulpius in 1889 are substantially correct. He concludes: (1) That Maclagan's reaction depends upon accidental conditions, and is, therefore, unreliable as a test; (2) that the impurities that are supposed to prevent the reaction have not been determined; and (3) that there exists no difference in the physiological action of cocaines, so long as they conform to the requirements of the Germ. Phar., III., whether they also respond to Maclagan's test or not. Pharm. Centralh., 1898, 1.

Cocaine Hydrochloide—Efficiency of Maclagan's Test.—The conclusions arrived at by Dr. Günther in his paper above quoted have induced the firm of Böhringer & Sons to make a reply, in which they maintain positively that a cocaine that does not respond to Maclagan's test contains isotropyl cocaine to such an extent as to make it unfit for use, since the latter is a strongly poisonous alkaloid, differing in action from cocaine, but acting as a powerful cardiac poison. To make Maclagan's test reliable, however, the following conditions are necessary: For 0.1 Gm. of cocaine hydrochloride dissolved in 85 Cc. of water, at least 0.15 to 0.2 Cc. of ammonia solution, sp. gr. 0.960, must be added, and the stirring must be energetic, the sides of the beaker rubbed with a glass rod and the liquid then well whipped in order to insure the separation of crystalline cocaine—this being prevented by the presence of isotropylcocaine.—Pharm. Centralh., 1898, 141.

In connection with this test for the purity of cocaine hydrochloride, Gehe & Co. point out in their report that the normal temperature of 15° C. is the most favorable for carrying out the operation, and that it is necessary to use absolutely pure distilled water, as the slightest trace of fatty substances in the water, or even introduced by holding the glass rod with greasy fingers, is sufficient to vitiate the test. Commenting on this, the "Pharm, Journ." (May 21, 1898, 473), observes that the objection is puerile even if it were correct, as it is not usual in analytical operations to use greasy liquids or utensils; but, as a matter of fact, there is no difficulty in obtaining the characteristic crystalline precipitate with a sample of pure cocaine hydrochloride by Maclagan's test, even after greasing the rod with oil to such an extent that oily globules separated in the liquid.

Cocaine Hydrochloride—Commercial Quality.—In order to ascertain the purity of the cocaine hydrochloride now commercially supplied, B. H. Paul and A. J. Cownley obtained four samples and subjected them to Maclagan's test, and to the "permanganate test" official in the Germ. Pharm. III. and in the U. S. Pharm. By Maclagan's test samples *A* and *B* produced a crystalline precipitate almost at once; sample *C* a crystalline precipitate, while sample *D* produced no precipitate for some time, and when it did, it was clotty and amorphous. Applying then the permanganate test, samples *A* and *B* retained their color for thirty minutes; in the case of sample *C* the color was less permanent; while in sample *D* the color disappeared at once and required four times the stipulated amount of potassium permanganate to give a permanent color for 30 minutes. It is evident from this that both tests show samples *A* and *B* to be pure and sample *C* to be fairly good cocaine hydrochloride, but that sample *D* cannot be accepted as being of good commercial quality. The authors also refer to Günther's criticism of Maclagan's test (see before). They have for some years been convinced of the reliability of this test, and emphatically express the opinion now that a sample of cocaine hydrochloride that does not answer Maclagan's test is not sufficiently pure for medicinal purposes. —Pharm. Journ., June 25, 1898, 586.

Orthoform—A New Local Anæsthetic.—Professor A. Einhorn and Dr. R. Heinz call attention to a new synthetic product related in constitution to cocaine, to which the name orthoform has been given, and which appears from their accounts to be remarkable because, while having remarkable local anæsthetic action and a powerful antiseptic, it is entirely without toxic character. It is described as a white, voluminous, crystalline powder, non-hygroscopic, melting at 120° C., slightly soluble in water. With hydrochloric acid it produces a crystallizable hydrochloride, which is readily soluble in water, but, having an acid reaction, it is not always applicable in this form though producing anæsthesia like the free ester.

Owing to its non-poisonous character, orthoform may be freely applied as a dusting powder for wounds, and it has been found remarkably effective in the treatment of burns, contusions and painful ulcers, while the operation of transplanting the living skin may be carried out under its influence without any sensation.—Pharm. Journ., Sept. 25, 1897, 277; from Münch. Med. Wochenschr., xliv., 931.

Orthoform—Anæsthetic Value.—Dr. E. S. Yonge has communicated to the "British Medical Journal" the results of the clinical trials of the new local anæsthetic, orthoform. He concludes that it will probably replace—by virtue of its insolubility and its innocuousness—its relative, cocaine, when long anæsthesia on ulcerated surfaces is wished for. He employs it in the form of powder, either alone or mixed with equal parts of lycopodium, for insufflations; in the form of pastilles, each containing 3 to 5 grains, in the treatment of mouth, tonsillar and posterior pharyngeal affections; in the form of collodion—as saturated solution—for ulcerations; in the form of spray (5 per cent.) for nasal and laryngeal ulceration; as a 10 per cent. ointment; and in the form of a 10 per cent. aqueous solution as a paint. Dr. Yonge's experience shows that orthoform made it possible for patients suffering from ulceration of the mouth and fauces to swallow solid food, although previously they swallowed liquid food only with pain.—Chem. & Drugg., Feb. 12, 1898, 277.

Caffeine—Investigation of Properties.—E. Tassilly found crystals of caffeine from aqueous solutions, which were carefully air-dried for a week, to give on analysis the following formula, $C_8H_{10}N_4O_2,H_2O$. On heating to 50°–55° C. this body commences to lose weight, and on increasing the temperature this loss of weight continues; but the whole of the water of crystallization is not driven off even at 150°, while the caffeine itself is volatile at this temperature. Experiments showed that caffeine is carried off by water vapor when evaporated on a water-bath, or even when heated up to 110°. Further experiments were made on the action of alkalies on caffeine, and it was found that though magnesia has no action, the same cannot be said of baryta and lime, which decompose it with the production of ammonia.—Chem. News, July 30, 1897, 59; from Bull. Soc. Chim. de Paris (3), xviii., No. 12, 1897.

Citrated Caffeine—Solubility and Commercial Quality.—Prof. Wm. A. Puckner reports upon the quality of citrated caffeine of the market as determined by one of his students, Mr. M. A. Harper, who found in three samples, 46.32, 48.42, and 47.20 per cent. of anhydrous caffeine respectively; the aqueous solution was shaken out with chloroform, the chloroform solution evaporated spontaneously, and the residue dried to constant weight over sulphuric acid. But, while these samples fairly agreed in their content of caffeine with the official preparation, they failed to dissolve so as to form a clear solution with about three parts of water. The same was found to be true with a sample officially prepared, but both this and the commercial samples formed permanent clear solutions when gently warmed, and the official requirement should therefore read: One part of citrated caffeine mixed with three parts of water, and gently warmed, will yield a clear, syrupy solution.—Proc. Ill. Pharm. Assoc., 1897, 70.

Theobromine—Study of Derivatives.—Dr. W. Van der Slooten communicates the results of comprehensive investigations and studies undertaken to determine the nature and character of the derivatives of theobromine resulting from the introduction of different alkyl-groups into its molecule. Heretofore the only derivative of theobromine that had been completely studied and identified was the "methyl theobromine" of Strecker, who found this compound to be identical with natural caffeine, and whose results were confirmed by E. Schmidt. The introduction of an ethyl-group into theobromine had also been attempted by Philips, but his investigations have remained incomplete. In his present paper the author reports upon the character and properties of *ethyl-*, *normal propyl-* and *isobutyl-theobromine*, the principal portion being devoted to the consideration of

Ethyl theobromine (Homo caffeine), $C_7H_7(C_2H_5)N_4O_2$. Operating upon theobromine the purity and identity of which had been determined by recrystallization, elementary analysis, etc., he introduced the ethyl group by the method of E. Schmidt and H. Pressler for preparing methyl theobromine. To a heated mixture of 10 Gm. theobromine and 40 to 50 Cc. of 90 per cent. alcohol a 10 per cent. alcoholic solution of KOH was added gradually in slight excess of the equivalent quantity. To the nearly solid mass so produced water was carefully added drop by drop until at the boiling temperature solution was effected, a little absolute alcohol being finally added. Upon cooling, a nearly solid mass was thus again obtained. To this an equivalent quantity of ethyl iodide was added and the mixture heated in a flask under pressure in the water-bath for 5 to 6 hours. The resultant crystalline magma so obtained was extracted with boiling water, the filtrate evaporated to complete dryness, and the dry residue extracted in a Soxhlet apparatus (to separate the ethyl theobromine from the potassium iodide formed) first by ether, and finally with chloroform. On evaporating the ether and chloroform solution, a nearly white residue was obtained, a perfectly pure and white product being obtained by recrystallization from water and subsequently from water containing a little ammonia. The yield of ethyl theobromine was between 8 and 9 Gm., in form of warty groups of handsome silky-glistening, needle shaped crystals, with difficulty soluble in cold water, but very soluble in hot water and in alcohol, ether, and chloroform. Unlike caffeine, which contains 1 mol. water, ethyl theobromine does not lose any weight when dried at 100° C.; but, like caffeine, it produces a handsome red-violet color when it is evaporated with chlorine water and the residue of evaporation is treated with ammonia. It also possesses the property of being sublimed without decomposition if carefully heated. The author has prepared the different salts of ethyl theobromine—the hydrochloride, hydrobromide and acetate, the double salts of platinum, gold and mercury, all of which resemble the corresponding salts of caffeine very closely, the principal points of difference being in the amount of water of crystallization contained in the corresponding compounds of the two bases. Similar analogy is found by him in the products obtained by the action of potassium hydrate, bromine, of oxidation by chromic acid, nitric acid, and by potassium chlorate and hydrochloric acid.

Normal Propyltheobromine, $C_7H_7(C_3H_7)N_4O_2$, was obtained by a process essentially identical with that by which ethyl theobromine was obtained, a little more than the equivalent quantity of normal-propyliodide being used for the reaction. The propyltheobromine was obtained in rosette-like groups of handsome, white needles, which are anhydrous, with difficulty soluble in cold water, but easily dissolved in hot water and in alcohol. It melts at 136° C., and, under careful heating, sublimes unchanged, giving also the red violet color upon evaporation with chlorine water and treatment with ammonia. These characters, as well as those of the gold and platinum double salts, which were prepared and described by the author, show great similarity between the ethyl- and propyl-theobromine obtained.

Isobutyltheobromine, $C_7H_7(C_4H_9)N_4O_2$, was also obtained under similar conditions to the foregoing. It formed white, warty crystals, melting at 129° to 130° C., anhydrous, nearly insoluble in cold water, and only sparingly soluble in hot water. In alcohol, ether and chloroform it is very soluble, and it resembles the previously described alkyl derivatives of theobromine, also in the character of its gold and platinum double salts, and in its color reaction with chlorine water and ammonia, the principal points of difference being its difficult solubility in water, as well as the greater difficulty to produce well-formed crystals of the base.—Arch d. Pharm., Nos. 6 and 7 (Aug. 17 and Oct. 15), 1897, 469–490.

Pilocarpidine—Relation to Pilocarpine.—It has already been shown by Merck that the base to which Harnack gave the name pilocarpidine is not convertible into pilocarpine by methylation, but that the isomer it yields differs from pilocarpine in being insoluble in water. Further investigations have now led the author to the conclusion that the pilocarpine and pilocarpidine are not, as Petit and Polonovski consider, isomeric, but entirely different in composition. He suggests that the discrepancies have arisen by the name pilocarpidine being given to different bases by the several chemists, and not confined to that first described by Harnack as having a composition represented by the formula $C_{10}H_{14}N_2O_2$. On repeating the experiments of Petit and Polonovski and heating pilocarpine hydrochloride for some time to a temperature of 200° C., Merck obtained similar results, the product having lower rotatory power and the gold or platinum salts lower melting points. But when pilocarpidine hydrochloride (Harnack) was subjected to the same treatment it underwent similar change, though that should not have been the case if the inferences of Petit and Polonovski were correct. Hence it is inferred that the substance to which they give the name pilocarpidine is merely pilocarpine more or less altered. On subjecting pilocarpine hydrochloride to the action of strong hydrochloric acid, by which treatment Hardy and Calmels state that it is convertible into a salt of pilocarpidine, Merck was equally unsuccessful in obtaining that result. Furthermore, it is stated by Hardy and Calmels that by long-continued boiling with water, pilocarpine is converted into pilocarpidine, according to the equation: $C_{11}H_{16}N_2O_2 + H_2O = C_{10}H_{14}N_2O_2 + CH_3OH$. On repeating this experiment no such change could be dectected by Merck.—Arch. d. Pharm., 1898, 141.

Pilocarpidine—Constitution.—Herzig and Meyer, referring to the recent results of Merck, point out that they had already shown that pilocarpine contains only one methyl group attached to nitrogen, and that they had also expressed a doubt as to the identity of pilocarpidine with the base obtained by Hardy and Calmels from pilocarpine to which they had given that name. Their view having been confirmed by the investigation of Merck, they have now determined that the product obtained by heating pilocarpine hydrochloride contains a methyl group attached to nitrogen, while previous observations with true pilocarpidine showed the contrary results. Methyl determinations have also been made with gold salts of the two bases, which fully establish the difference between true pilocarpidine and the altered pilocarpine, to which the name pilocarpidine was applied by Petit and Polonovsky.—Pharm. Journ., May 14, 1898, 449; from Monatshefte, 1898, 56.

Phenylpilocarpine—Therapeutic Value.—Edson calls attention to the value of phenylpilocarpine—$C_{11}H_{16}N_2O_2.OH.C_6H_5$—a colorless, oily liquid, soluble in water and in alcohol, in the treatment of phthisis and of intermittent fevers. Under the name of

Aseptoline, he employs a solution of 2 centigrammes of phenylpilocarpine and 2.75 Gm. of phenol in 100 Cc. of water, injecting 3 to 5 Cc. of this fluid daily into the gluteal region in cases of phthisis, the dose being gradually increased until a maximum amount of 6 to 7 Cc. is reached. In recurrent fevers, the patient on the first day is treated with two injections each of 6 Cc. of aseptoline, on the right and left side of the abdomen, followed with a single injection for the next six days, and afterwards the same dose once in three days.—Pharm. Journ., Jan. 22, 1898, 84; from Therap. Woch., 1897.

Strychnine—Action of Sulphuric Acid in Forensic Determinations.—E. H. S. Bailey and Wm. Lange have made some experiments to determine, if possible, to what extent the process of purifying the alkaloid separated in toxicological investigations from the last portions of organic matter, by evaporation with a drop or two of strong sulphuric acid, affected the delicacy of the tests for the detection of strychnine. It seemed to them probable that inasmuch as the concentrated acid destroys organic matter associated with the alkaloid, it might also, under these conditions, partially destroy the latter, or by hydrolysis or in some other way, so change it that its presence could not be discovered by ordinary reagents. The results of their investigations, which are given in some detail, have confirmed the authors' suspicions. They find that the action of sulphuric acid decreases the delicacy of the reaction for strychnine, so that although $\frac{25}{1000000}$ of a milligram was detected in the original solution, after heating with sulphuric acid, only $\frac{11}{100000}$ of a milligram was detected. But after treatment with sulphuric acid and then shaking out with chloroform, it was not possible to find the strychnine except in a solution that contained $\frac{2}{100}$ of a milligram, and it is evident, therefore, that while the treatment with sulphuric acid does diminish the delicacy, this diminution is probably not so large as would occur in the process of shaking out with chloroform. In the latter process much of the strychnine is retained in the organic matter, so that the portion that can be obtained from the chloroform solution is only a fraction of that which was originally present.—Amer. Journ. Phar., Jan., 1898, 18–21.

Strychnine Hydriodide—Character, Composition, etc.—J. Rutherford Hill, during the investigation of a precipitate occurring in a mixture containing strychnine and *potassium iodide* (which see under "Inorganic Chemistry"), referring to the usual authorities, was unable to find any information of practical use concerning strychnine hydriodide. A quantity was therefore prepared by dissolving strychnine in excess of hot, freshly-prepared hydriodic acid, the recrystallized product being in form of pale straw-colored acicular crystals, soluble in 309 parts of water, forming neutral solutions, but after standing a few days showing slight evidence of decomposition. The salt itself seems to be quite stable, and experiments made appear to have a composition corresponding to the formula $C_{21}H_{22}N_2O_2HI,2H_2O$. A salt containing only one molecule H_2O is obtained when its crystallization is effected from hot dilute alcohol.—Pharm. Journ. April 23, 1898, 389.

Strychnine Hydride—A New Alkaloid.—By the addition of metallic sodium to a boiling alcoholic solution of strychnine, Prof. Dresser has succeeded in obtaining small quantities of a new alkaloid, strychnine hydride, which possesses properties in nearly all respects the opposite of those of strychnine. Subcutaneous injections of 0.5 to 1 milligramme did not produce tetanus in frogs, but caused a gradual narcotic paralysis, comparable to that produced by morphine, but much more energetic. Simultaneous injection of the hydride and of strychnine or picrotoxin failed to produce any tetanic effect. Nevertheless, the hydride cannot be employed as an antidote to strychnine poisoning, because of its effect on both frogs and rabbits to produce paralysis of the respiratory organs.—Pharm. Centralh., Nov. 11, 1897, 763.

Mydriatic Alkaloids—Status of Our Present Knowledge.—Gordon Sharp contributes an interesting account of our present knowledge of the mydriatic alkaloids known under the names of duboisine, daturine, hyoscyamine, hyoscine and scopolamine, and summarizes his observations concerning them as follows:

(1) The names daturine and duboisine should be given up.

(2) The relationship of atropine and hyoscyamine can hardly be said to be clearly understood. If this point were cleared up, much would be gained and the way paved for futher investigation of the other members of the group.

(3) Of hyoscine one can say little. It is like atropine in its action.

(4) Scopolamine cannot lay claim to be a new base.

The artificial alkaloids to which the name tropeines has been given do not concern us.—Trans. Brit. Pharm. Conf. (Yearbook of Pharm.), 1897, 439–444.

Hyoscine vs. Scopolamine—Present Status of the Controversy Concerning their Indentity.— Louis Merck explains the present status of the hyoscine-scopolamine question, which, after having been apparently dormant for a time, again engages scientists of note in controversy on opposite sides. It was Ladenburg who originally isolated from the mixture of bases obtained from hyoscyamus seeds, known as "amorphous hyoscyamine," a substance to which he gave the name "hyoscine." He assigned to this new base the formula $C_{17}H_{23}NO_3$, thus claiming it to be an isomer of "atropine" and "hyoscyamine;" but Hesse contended that the new base was possessed of the composition $C_{17}H_{21}NO_4$, and declared it to be identical with the substance which E. Schmidt had isolated from *scopolia atropoides*, and which had been named "scopolamine." Indeed, the latter found the "hyoscine hydrobromide" of the market to consist almost exclusively of "scopolamine hydrobromide;" though he does not question the existence of a hyoscine of the composition $C_{17}H_{23}NO_3$, being inclined to the belief that a base of such composition may be contained in the mixture of alkaloids obtained from the *solanaceæ*, that Ladenburg had actually got hold of a base which gave him the data for his formula and description of what he called "hyoscine," and that the same base has since then happened to be isolated again. But be that as it may, the author states positively that the "hyoscine" put upon the market by E. Merck *has been and is identical with "scopolamine,"* and that this firm has retained the name "hyoscine" for the base from hyoscyamus, and "scopolamine" for the base from *scopolia atropoides*, simply so as to obviate misunderstandings in commercial and medical circles, where a change of name is apt to create great confusion.

Mr. Merck furthermore states that since the opening of the controversy the chemists of the Merck laboratories have steadily directed their attention towards the identification in solanaceous drugs of a base possessing the properties of "hyoscine" and the formula $C_{17}H_{23}NO_3$; but, notwithstanding that they have since that time worked up enormous quantities of such drugs, they have not succeeded in isolating a base fullfilling both conditions. On the other hand, they have succeeded to isolate from *duboisia myoporoides* a base $C_{17}H_{23}NO_3$, and consequently isomeric with hyoscyamine and atropine, but totally different in its properties from "hyoscine." To this new base they have given the name "pseudohyoscyamine." In fine, the whole question has by this time dwindled down almost exclusively to a controversey between O. Hesse and E. Schmidt as to the propriety of designating the surely established alkaloid $C_{17}H_{21}NO_4$, either as "scopolamine" or as "hyoscine."—Amer. Journ. Pharm., Nov. 1897, 593–598; from Journ. Soc. Chem. Ind., June 30, 1897.

Scopolamine—Optically Active and Inactive Varieties.—Professor E. Schmidt, speaking on the subject of scopolamine and the controversy into which it has been placed by the observations of O. Hesse, states that the circumstance that the commercial scopolamine hydrobromide has a much lower rotatory power than the salt prepared from henbane is attributed by him to the presence of a varying admixture of the salt of a base that is an optically inactive form of scopolamine, viz.:

i-Scopolamine, into which normal scopolamine is convertible by the action of the argentic oxide or caustic alkalies, but without any alteration of the other physical characters of the base or of its physiological characters. The fact that scopolamine may be obtained with normal rotatory power or with feeble rotatory power, according to the mode of operating on scopola root, is regarded by the author as indicating that the inactive base does not exist naturally in the root, but is produced in the course of extraction. The characters of *i-scopolamine* are described as follows: The base crystallizes in hard rhombic prisms, having air-dried the composition $C_{17}H_{21}NO_4 + H_2O$, and melting at 56° C. The hydrobromide melts at 100° C., and contains no water of crystallization, while the aurochloride, $C_{17}H_{21}NO_4.AuCl_4H$, melts at 208° to 210° C.—Pharm. Journ., Oct. 30, 1897, 377.

Atropine Periodides—Preparation and Characters.—H. M. Gordin and A. B. Prescott contribute some of the results of their studies and investigations upon the periodides of atropine, the present paper dealing principally with the

Enneaiodide of Atropine ($C_{17}H_{23}NO_3.HI.I_8$) and its double compound with mercury. This periodide is formed as a precipitate when aqueous solutions of atropine salt and of acidulated solution of iodine in potassium iodide of certain concentration are mixed together; but being unstable in a water-moist condition, it is best prepared by the use of chloroform as solvent. On adding twenty grammes of atropine to a warm solution of thirty grammes of iodine in 500 Cc. of chloroform, the enneaiodide crystallizes out very soon in small, shining, dark-green crystals. If these be removed by filtration, the mother-liquor will yield several successive crops of the dark-blue pentaiodide, and at last a crop of the brownish red triiodide.

Obtained from watery solution, the precipitate—which must be dried rapidly by the aid of a suction air-pump and in vacuum over sulphuric acid—the enneaiodide is a very dark-brown, almost black powder, quite permanent in dry air, and has only a slight odor of iodine. It is very difficultly soluble in ether, chloroform, benzene, or carbon disulphide, but is soluble in alcohol, very freely when hot, crystallizing from the latter solution on cooling in the form of dark-green crystals and leaflets, having the same properties as the non-crystallized body. In cold water it is insoluble; hot water decomposes it quickly; it is also decomposed by concentrated solution of potassium iodide. At 90° C. it commences to give off iodine vapors, and at 140° C. melts to a dark liquid. In this ennea iodide one-ninth of the total iodine is firmly combined just as in normal hydriodides, while eight-ninths is easily removed by reducing agents, such as sulphur dioxide and sodium thiosulphate. The compound, therefore, may be considered an atropine hydriodide octaiodide.

Atropine Mercuric Iodide may be obtained from the periodides of atropine by shaking the alcoholic solution of the periodide with mercury and gently warming the mixture. If the higher periodides be used in the preparation of the double iodide, there is always a separation of mercurous iodide; but, if the theoretical quantities of atropine and iodide are used, there is no separation of mercurous iodide. The formula of the double iodide of mercury and atropine seems to be $C_{17}H_{23}NO_3.HI.HgI_2$, and it resembles in composition several other double iodides of alkaloids and mercury obtained by Grover by a different method. But besides this double iodide the authors obtained one having the composition $(C_{17}H_{23}NO_3.HI)_2.HgI_2$, by treating a solution of the compound in diluted alcohol with an excess of potassium iodide.

Monoatropine Hydriodide Mercuric Iodide.—$C_{17}H_{23}NO_3.HI.HgI_2$—crystallizes in shining yellow crystals, melting at 89° to 90° C. The compound is difficultly soluble in ether or chloroform, but partly soluble in water.

The formation of atropine enneaiodide under the conditions described by the authors, affords a convenient method for estimating the strength of atropine solutions by means of a standard solution of iodine and titrating back with a standard solution of sodium thiosulphate. The details of the method are given, and the results are very good if a little care is given to it; but whether the method is applicable to the assay of crude drugs containing atropine, and their galenical preparations, must be determined by further experiments which the authors intends to make.—Amer. Journ. Pharm., June, 1898, 294–303; from Journ. Amer. Chem. Soc., May, 1898.

Tropine—New Derivatives.—In continuation of the work of E. Schmidt and his pupils on tropine, A. van Son has studied the action of monochloracetic acid, ethylene chlorhydrin, and ethylene bromide on tropine, and finds that it behaves towards these bodies in a manner analogous to trimethylamine, pyridine, and other simply-constructed tertiary bases.

Tropine-betaine Chloride was obtained by the action of monochloracetic acid at 130° C. The gold salt melts at 223° to 224° C., the platinum salt at 227° C.

Tropine-choline Chloride was obtained by heating tropine for three hours at 100° with ethylene chlorhydrin. The gold and platinum salts were also obtained.

Tropine-neurine was obtained by first making an addition product of tropine with ethylene bromide, and digesting this with silver oxide. It is left for further investigation to determine in what respects these derivatives resemble betaine, choline, and neurine in their physiological action.—Arch. d. Pharm. 1897, 685.

Homatropine—Easy Method of Preparation.—According to E. Täuber, homatropine is easily made by passing a current of hydrochloric acid gas over a mixture of tropine and amygdalic acid heated to 110°–120° C.—Pharm. Centralh. 1898, 133.

Euphthalmine—A New Synthetic Mydriatic.—It is stated in L'Union Pharm. (xxxviii, 436) that the hydrochloride of *N-methylvinyl-diacetonalkamine*, introduced under the name of euphthalmine, is a new synthetic mydriatic. It is used in 5 or 10 per cent. solution, dilating the pupil and paralyzing the accommodation as rapidly and as completely as homatropine, over which it possesses the advantage that the effects disappear more quickly after its use.—Pharm. Journ., Oct. 30, 1897, 378.

Euphthalmine Hydrochloride—Characters.—In his original description of euphthalmine hydrochloride, $C_{17}H_{25}O_3N.HCl$, C. Harris had stated that this salt was very deliquescent; but he has since ascertained that by recrystallization it loses this objectionable character, and can be obtained in the form of a very permanent, snow-white, crystalline powder, which is very soluble in water, and soluble in two parts of boiling absolute alcohol, from which it separates again on addition of ether in crystalline aggregation. The salt is anhydrous, begins to run together at 181° C., and melts at 183°–184° C.

Euphthalmine Salicylate, $C_{17}H_{25}O_3N,C_6H_4(OH)COOH$, is prepared by mixing ether solutions of the base and salicylic acid, and recrystallizing from absolute alcohol and ether. It melts at 115°–116° C., and is very soluble in water.—Pharm. Journ., May 14, 1898, 449; from Berichte, xxxi., 665.

Aconite Alkaloids—Source of Activity.—According to J. T. Cash and W. R. Dunstan, the extraordinary toxic power of *aconitine* is mainly dependent on the presence of the acetyl radicle in the molecule, whilst the specific action of *benzaconine* depends on the existence in its molecule of the benzoyl radicle. *Aconine*, which contains neither the acetyl nor benzoyl group, is very inert, but both aconine and, in a less degree, benzaconine, are said to act as antidotes to aconitine. The authors, furthermore, state that neither the composition nor constitution of aconitine can yet be regarded as settled.—Pharm. Journ., April 2, 1898, 323; from Proc. Royal Soc., lxii., 338.

Veratrine—Characters and Compounds.—Geo. B. Frankforter, after giving an elaborate review of the veratrums, particularly *veratrum viride*, and a concise history of the work upon the veratrum alkaloids, communicates the results of his experiments made with a sample of crystallized veratrine. He observes that one of the chief causes of the exceptional variations observed in the substance commonly known in pharmacy as veratrine—variations in composition, as well as in chemical, physical and physiological properties—is the extreme difficulty with which the alkaloid crystallizes, thus almost excluding the most important means of purification. The sample under experimentation was of a light gray color, and appeared, when highly magnified, in imperfect granular crystals. It was slightly soluble in water, very soluble in methyl-, ethyl- and amyl-alcohols, and in ether, acetone, chloroform, and carbon disulphide. Its melting-point after repurifying was 146° to 148° C., and its identity with that described by Merck and Ahrens was established by elementary analysis, as well as by the melting point of the gold double salt. The formula was made out to be $C_{32}H_{49}NO_9H_2O$. The author prepared and investigated the tetra-, tri- and mono-iodides of veratrine, as well as the methyliodide, methylhydroxide, methylhydroxyhydrochloride, ethylbromide, and allyliodide of veratrine. The author concludes that the structural formula of veratrine is still a mystery, but is engaged in experiments which he hopes will throw some light on the structure of this important compound. From the odor of picoline by a destructive distillation, and the isolation of β-picoline by Ahrens, it is evident that veratrine is a pyridine derivative, resembling in many respects nicotine. The work of Schmidt and Köppen indicates the presence, also, of both cevadic and tiglic acids, but certainty can be attained only by future experiments.—Am. Journ. Pharm., July, 1897, 372–373; from Bull. No. 9, Minn. Botan. Studies, 1897.

Veratrine—Value as an Errhine in Bronchites.—Sir Dyce Duckworth calls attention to the value of errhines in suffocative bronchitis, when coughing does not cause adequate expectoration, and particularly to a snuff containing about 5 per cent. of veratrine, with starch, lycopodium, or licorice powder as a base. Such a snuff is usually unfailing to provoke effective sneezing and cough, with abundant expectoration, the powder being used two or three times a day, the patient being at the same time under internal treatment with ammonium carbonate, senega, nux vomica, or terebene.—Pharm. Journ., April 16, 1898, 365; from Practitioner, March, 1898, 272.

Hydrastine—Compound with Monocalcium Phosphate.—With the endeavor to enlarge the number of soluble salts of hydrastine, T. H. Norton and H. E. Newman have made and recorded some experiments by which they succeeded in preparing a compound of the apparent composition of 2 mol. of monocalcium phosphate and 3 mol. of hydrastine, viz., $2Ca(H_2PO_4)_2.3C_{21}H_{21}NO_6$. A cold saturated aqueous solution of monocalcium phosphate—purified by prolonged washing with alcohol—was triturated with a large excess of pure hydrastine. A certain amount of the alkaloid was thus caused to enter into solution; time, as was eventually found, being an important factor. The filtrate yielded under all conditions of evaporation, spontaneously, by heat, or in vacuum, an amorphous resin-like residue, without the slightest trace of crystallization. This residual double salt was soluble in 10 p. of cold water, but was changed into a syrup by a small amount of boiling water. It is also easily soluble in cold or boiling alcohol, and in about the same proportions. It melts at 126° to 128° C.—Amer. Journ. Pharm., Nov., 1897, 604–606; from Journ. Amer. Chem. Soc., Oct., 1897.

Chelidonine—Investigation of Chemical Constitution.—Arthur J. G. Tyrer, operating upon chelidonine partly prepared by him from fresh chelidonium roots and partly obtained from Merck—the crystallized base being in both cases in transparent tables melting at 135° C.—has endeavored to determine its chemical constitution. In its behavior to reagents, the base corresponds with the accounts given by Henschke and Selle in 1888 and 1890, its composition being $C_{20}H_{19}NO_5+H_2O$, as stated by these authors. The hydrochloride, hydrobromide and phosphate were prepared and analyzed. Its behavior towards methyl-iodide is similar to that found by Henschke towards ethyl-iodide. It had little effect below 100° C., but reaction took place at 130° to 140° C., and a crystalline compound was obtained, having a composition represented by the formula, $C_{20}H_{19}NO_5$-CH_3I. By the action of acetic and benzoic anhydrides, the compounds mono-acetyl-chelidonine, $C_{20}H_{18}(C_2H_3O)NO_5$, and mono-benzoyl-chelidonine, $C_{20}H_{18}(C_7H_5O)NO_5$, were obtained, showing, what had not been shown conclusively by Henschke's experiments, that only one of the five oxygen atoms is present in the base as an HO group. The elimination of water mentioned by Henschke could not be observed. A crystalline oxime, $C_{20}H_{19}NO_4,N,OH$, was obtained by treatment with hydroxylamine.—Phar. Journ., July 10, 1897, 21; from Apoth. Ztg., xii., 442.

Corydaline—Characters and Relation to Dehydro-corydaline.—W. Harrison Martindale, at the suggestion of Prof. E. Schmidt, has made a chemical examination of the tubers of *corydalis cava* (*c. tuberosa*, D. C.), with special attention to the decomposition products of corydaline. The author's predecessor, Ziegenbein, had previously obtained from 20 kilos of the tubers: Corydaline, 114 Gm.; bulbocapnine, 82 Gm.; corycavine, 12 Gm.; and some corybulbine. Operating upon the same quantity (20 kilos of corydalis tubers) by a process described, Mr. Martindale obtained eventually 180 Gm. of corydaline, the other bases being practically absent, and its purification, therefore, comparatively easy, simply recrystallization and the use of animal charcoal for decoloration being necessary. Corydaline, when pure, melts at 134°—135° C. Combustion leads to $C_{22}H_{27}NO_4$ as the correct formula. It turns yellow on exposure to air, due to oxidation, whereby 4 mols. of hydrogen are removed, and

Dehydrocorydaline, $C_{22}H_{23}NO_4$, is formed, but may readily be removed by washing with alcohol. The author's present researches are largely concerned with this body, which by the assumption of 4 molecules of hydrogen is converted into a base having the same composition and the same melting point as natural corydaline, yields with one or two exceptions similar salts, but is completely inactive towards polarized light and may therefore be called "inactive corydaline." To prepare this, the author employs

Dehydrocorydaline Hydroiodide.—$C_{22}H_{23}NO_4.HI + 2H_2O$, which is best obtained from perfectly pure corydaline by heating its alcoholic solution with an excess of iodine in strong stoppered glass bottles in a water-bath for two hours. The quantities employed were corydaline, 5 Gm.; iodine, 5 Gm.; alcohol, 96 per cent., 100 Cc. The contents of the bottle are allowed to cool undisturbed before it is opened; the periodides will have separated in shining rosettes of crystals on the side, and as a brown mass on the base of the bottle. The periodides are then separated from the mother liquor, and excess of iodine is removed by treating with thiosulphate and sodium carbonate until a light yellow solution is obtained. The mother liquor is treated in a similar manner, and these solutions are allowed to crystallize; the hydroiodide separates in shining citron-yellow needles, and was found, in contradiction to Ziegenbein's observation, comparatively easily soluble in water, especially on addition of a few drops of dilute sulphuric acid.

Inactive Corydaline may then be obtained by heating such a solution containing a little solution of sulphuric acid on a steam bath, and maintaining for about a day a brisk evolution of hydrogen in this solution by alternate addition of zinc—previously etched with platinic chloride—and sulphuric acid. The solution, which should eventually be colorless, is allowed to cool, filtered, and the filtrate poured into strong solution of ammonia. The zinc hydrate precipitated redissolves, and the alkaloidal base separates as a flocculent mass on the surface, and may be easily collected, washed, dried and recrystallized from alcohol. The mother liquor may be shaken out with ether, but contains little of the alkaloid. Inactive corydaline is tasteless, and much less sensitive to light than the natural base.

A chloroformic solution of the base so obtained, when examined in Laurent's apparatus, was found to be completely inactive, while Freund and Josephi had found the rotatory power of corydaline to be $[\alpha]_D = + 300.1$]. Combustion proved that the composition of this inactive corydaline was the same as that of the natural corydaline. Its salts are much easier to obtain than the corresponding ones of the natural alkaloid, and there exists only a variety of small differences, the principal difference being in the respective gold salts.—Pharm. Journ., June 18, 1898, 571–573.

Dioscorine—Preparation, Properties, Toxicity, etc.—Schütte has prepared dioscorine, the alkaloid first obtained from *dioscorea hirsuta* by Boorsma, in 1889, by extracting the tubers by means of alcoholic hydrochloric acid, liberating the alkaloid, shaking out with chloroform, converting into hydrochloride, and purifying the hydrochloride by recrystallization. The alkaloid liberated from this salt slowly forms yellowish-green crystals, which melt at 43.5° C., are very hygroscopic, are strongly basic, liberating ammonia from its salts, and are slightly volatile.

Dioscorine Hydrochloride, $C_{13}H_{19}NO_2HCl + 2H_2O$, crystallizes from alcohol in two forms, in needles or in tablets. It loses its water at 37.7° C., and the anhydrous salt so obtained melts at 95.5° C. The platinum and gold salts are both crystalline. On the animal organism dioscorine acts as a paralyzant of the nervous system, but is not a protoplasmic poison, its toxic action resembling that of picrotoxin.—Pharm. Journ., Nov. 27, 1897; from Pharm. Zeitschr. f. Russl., xxxvi., 279.

Retamine—A New Alkaloid from Retama sphærocarpa.—Battandier and Malosse have separated from the young branches and bark of *retama sphærocarpa*, by the ordinary processes, an alkaloid which they have named *retamine*. This alkaloid, which was obtained to the amount of 0.4 per cent. from the fresh plant, is only slightly soluble in water or ether, more soluble in alcohol and petroleum ether, and very readily in chloroform. It crystallizes in long needles, prismatic plates, or rectangular plates, according to the solvent and conditions of concentration, is dextrorotatory, melts at 162° C., and decomposes at a higher temperature. It is a powerful base, yields with acids clearly defined salts, displaces ammonia, and precipitates the hydrates of iron, copper, etc. In its turn, it is precipitated from its saline solution by the caustic alkalies. The salts of retamine give the general alkaloid reaction, and, with the exception of the nitrate, crystallize easily. The elementary analysis indicates the formula $C_{15}H_{26}N_2O$, and it is probably an oxysparteine, though differing from the artificial oxysparteine known at present.—Amer. Journ. Pharm., Dec., 1897, 644; from Journ. de Pharm. et de Chim. (6), *6*, 241.

Retamine Salts—Properties.—In continuation of their researches, the authors find that retamine forms two hydrobromides, containing one and two molecules of the acid respectively. The sulphate is obtained from aqueous solutions in crystals containing 5 molecules of water, while from alcoholic solution a salt containing 2 molecules of water is obtained. The alkaloid forms neutral and basic salts, the neutral salts containing two molecules of monobasic acid, or one molecule of dibasic acid.—Pharm. Journ., Oct. 30, 1897, 378; from Compt. rend., cxxv., 450.

Piperidine Guaiacolate—Preparation, Character and Therapeutic Importance.—According to Rosenheim and Schidrowitz, piperidine guaiacolate, $C_5H_{11}N[C_6H_4(OCH)_3(OH)]_2$, is best obtained by dissolving 2 molecules of the guaiacol in benzene, and one molecule of the piperidine in light petroleum. The white, crystalline mass is thoroughly washed with light petroleum, and then recrystallized from acetone or a mixture of benzene and light petroleum. It forms splendid colorless prisms, melting at 79–80° C., and is fairly soluble in water, very easily in benzene, alcohol, ether, acetone, and ethyl acetate, but almost insoluble in light petroleum. The pure substance gradually assumes the odor of guaiacol on exposure to air. When evaporated several times on a water-bath with concentrated hydrochloric acid, it is totally decomposed, the whole of the guaiacol being volatilized and piperidine remaining as hydrochloride.

A physiological and therapeutical examination of the piperidine guaiacolate was made by Dr. Tunnicliffe, who states that this substance has already been introduced into medicine, and has been found to be of considerable service in phthisis. It forms a relatively soluble salt, and can be given either in solution or in the solid form. It has none of the irritant properties of guaiacol, and there is reason to believe that the base, that is, the piperidine, not only neutralizes these irritant properties, but exerts its own specific action, namely that of a vascular and nervine tonic.—Pharm. Review, May, 1898, 202, from Journ. Chem Soc., 1898, 141.

Anagyrine—Constitution.—Prof. E. Schmidt has examined anagyrine, the alkaloid occurring with cytisine in the seed of *Anagyris fœtida*, with the view of determining its constitution. He finds that the reactions and general properties of anagyrine are very similar to those of cytisine. The beautifully crystalline hydrobromide, hydrochloride, platinum, gold, and mercury double salts furnished on analysis values corresponding to the formula $C_{15}H_{22}N_2O$. The behavior of anagyrine towards alkali iodides and nitrous acid is that of a tertiary base. Considering that cytisine is a secondary base, and that the difference between the formulæ of both is only C_4H_8, the hypothesis that anagyrine is related to the butyl cytisines seems well founded. This point is still being determined by comparing with anagyrine the various butyl cytisines obtained by butylizing cytisine. —Pharm. Zeit., 1897, xlii., 653.

Betaine—Occurrence and Isolation from Althæa Roots.—N. Orlen has isolated betaine as well as asparagine from the root of *althæa officinalis* by the following process: The roots were extracted several times with water, the extracts being finally evaporated, precipitated with basic lead acetate, and the excess of lead removed by hydrogen sulphide. The fluid was then evaporated to a small volume and set aside for some days to allow the asparagine to crystallize out. The solution was next drawn off, the crystals washed with weak alcohol, and the united fluids mixed with a solution of mercuric nitrate after the distillation of the alcohol. This precipitated the rest of the asparagine. The filtrate was then treated with hydrogen sulphide, evaporated, acidulated with nitric acid and, after adding a solution of sodium phospo-molybdate, set aside for two days. The precipitate was then collected on the filter, washed with very dilute sulphuric acid, mixed with aqueous barium hydrate solution, the solution filtered, freed from the excess of barium by carbonic acid, evaporated to dryness, and the residue extracted with alcohol. After extraction, a yellowish crystalline substance remained, which formed colorless crystals on being recrystallized from alcohol or water with animal charcoal. The substance thus obtained was soluble in water or alcohol, and precipitated by ether from the alcohol solution. It contained nitrogen. The alcoholic solution of the free base, treated with alcoholic chloride of zinc solution, gave a precipitate, the volume of which increased on standing. The base gave all the characteristic reactions of betaine.—Pharm. Journ., Feb. 5, 1898, from Pharm. Zeit. f. Russl., xxxvi., 631.

Betaine and Cascarilline.—Two alkaloidal constituents of *Cascarilla Bark*, which see under "Materia Medica."

Cuschygrine—An Alkaloid from Bolivian Cusco Leaves.—Liebermann, Cybulski and Giesel have isolated from Bolivian cusco leaves an alkaloid to which they have given the name "cuschygrine." It is a colorless, oily liquid of the composition $C_{13}H_{24}N_2O$, soluble in water, forming a hydrate, $(C_{13}H_{24}N_2O)_2 7H_2O$, which crystallizes in neeldes melting at 40° to 41° C. It is dissociated slowly in the air. With hydrochloric acid the base gives a dihydrochloride, $C_{13}H_{24}N_2O.2HCl$; the platinum salt and the gold salt have also been obtained. Besides this, another base has been isolated, having the composition $C_8H_{15}NO$, which gives an acid when oxidized by chromic acid; this has the formula $C_6H_{11}NO_2$, and is called hygrinic acid. This latter, on distillation, splits into CO_2 and a methyl-pyrolidine, $C_5H_{11}N$, a powerful base, which resembles coniine or nicotine in odor, and the fumes of which occasion intense headache. It does not give the same substitution bodies as piperidine, and appears to be a tertiary base of the constitution, $C_4H_8N—CH_3$.—Pharm. Journ., Aug., 1897, 191; from Berichte, 1897 (28), 578 (30), 1113.

Choline and Trigonelline.—Alkaloidal contaminations of the *strophanthin* of commerce, which see under "Glucosides and Neutral Principles."

Aniline—Formation of Double Salts with Nickel, Cobalt, and Other Metallic Salts.—D. Tombeck has already shown that aniline and its derivatives, such as the bases of the pyridine series, are able, like ammonia, to combine with the haloid salts of zinc and cadmium, giving well-crystallized bodies, of which he has described the composition and properties. He now finds that compounds analogous to those used before give corresponding compounds with nickel, cobalt, magnesium and manganese salts under conditions but slightly different. Aniline again, like ammonia, combines with several oxygenated salts. The general method for the preparation of the compounds formed in this case consists of pouring an excess of aniline into a solution of the metallic oxygenated salt; on agitation the crystalline precipitate is formed.—Chem. News, May 5, 1898, 213; from Compt. rend., March 28, 1898.

Methylene Blue—Precaution when Prescribing.—Dr. Harrington calls attention to the importance of care when prescribing "methylene" blue that the name should be written out in full, and not contracted to "methyl." blue. He quotes a case in which poisoning occurred when a prescription was written "methyl. blue, 3 grains," instead of "methylene blue."

Pyoctanin (Merck's methyl blue) was dispensed, and produced vomiting and purging. Prescribers should be aware that methyl blue and methylene blue are two totally distinct bodies, and that *only methylene blue is suitable for internal use.*—Pharm. Journ., Feb. 26, 1898, 186; from Canad. Pract., through Therap. Gaz., xxii., 44.

Ethylamine—A Possible Remedy for Gouty Affections.—It is stated in "Pharm. Zeit." (xlii., 541) that ethylamine forms with uric acid a very stable salt which is readily soluble in cold water. Experiments point to the conclusion that it will prove valuable as a remedy in the treatment of gouty affections due to its solvent action on uric acid concretions.

Acetanilid—Available Test for its Presence in Phenacetin.—George Wagner having occasion to test for the presence of acetanilid in phenacetin, found the tests usually relied on for determining its presence unavailable because of the close relationship of the two bodies. These are the so-called "isonitril test," which depends upon the peculiar disagreeable odor produced when acetanilid is boiled with solution of sodium hydrate and a few drops of chloroform are added, and the "indophenol test." which depends upon the ruby-red color, followed by deep blue on addition of excess of ammonia, when 1 Gm. of acetanilid is boiled with 1 Cc. of HCl and then 1 Cc. each of saturated solutions of phenol and of chlorinated lime are added. The author, however, found a test mentioned in "Flückiger's Reactions" to be available. If to one or ten Cc. of a cooled mixture of 10 Cc. of a 2 per cent. solution of potassium dichromate and 30 Cc. of strong sulphuric acid a pinch of acetanilid is added, a ruby-red color results, which soon changes to blue and then fades out. It is important that the liquid should be cool, else the changes of color are so rapid that the eye cannot follow. Phenacetin does not produce this reaction, which will easily detect the presence of 10 per cent. of acetanilid in it—but how much less requires further experiment.—Proc. Kansas Pharm. Assoc., 1897, 32.

Anilipyrine—A New Antipyretic.—Gilbert and Loon have given the name "anilipyrine" to a product obtained by melting together one part of antifebrin and two parts of antipyrine. It is readily soluble in water, feebly toxic, and possesses the advantage of reducing temperature to a greater extent than antipyrine, though less than antifebrin. The dose is 0.5 Gm. singly, or from 1 to 2 Gm. daily.—Pharm. Centralh., 1897, 501.

Pherin—A Sulpho Derivative of Phenacetin.—Van Vamossy and Fenyvessy communicate the results of their studies upon the therapeutic value of cosaprin and another new antipyretic, "pherin." This substance is a sulpho-derivative of phenacetin, just as cosaprin is of acetanilid. Pherin forms a pale reddish-brown, light, amorphous powder, having a mildly caustic and saline taste. It is very soluble in water, forming a slightly acid brown solution. Both cosaprin and pherin have been found by the authors to possess energetic antipyretic power, and advantageously replace the bases from which they are made because of their ready solubility in water, the rapidity of their effect, and their comparative harmlessness. The only disadvantage is the short period of their activity, but this may be compensated by successive small doses.—Merck's Rep., Oct. 1, 1897, 604; from Therap. Monatsh., xi., 428.

Antipyrine—Compounds with Metallic Salicylates.—A new series of compounds has been obtained by Dr. M. Schuyten by combining antipyrine with metallic salicylates. They are composed and described as follows:

Ferri-Salipyrine (Iron-Salicylate-Antipyrine), $3(C_{11}H_{12}N_2O),2[(C_6H_4.\text{-}OH.CO_2)Fe]$, is a yellowish-brown powder, separating from water in badly-defined crystals having a greenish flucrescence, becoming black at 67° C., and melting at 70° to 73° C.

Nickel Salipyrine (Nickel-Salicylate-Antipyrine), $3(C_{11}H_{12}N_2O),[(C_6H_4.\text{-}OH.CO_2)Ni.2H_2O)$, forms a pale-green powder, but crystallizes from alcohol in almost white needles, which melt at 120° C., turning dark green on losing water of crystallization, which they partially recover on exposure to moist air.

Cobalt-Salipyrine (Cobalt-Salicylate-Antipyrine) has a similar composition to the foregoing, and constitutes a pale-red powder, crystallizing from its aqueous solution in dark-red crystals, which melt at 106° C., becoming of a handsome blue.—Pharm. Post, Nov. 21, 1897 (xxx.), 587.

Antipyrine—Absorption of Iodine as a Means of Estimation.—J. Bougault has experimented with the object of determining the conditions under which the absorption of iodine by antipyrine takes place, and he arrives at the conclusion that the reaction which takes place in alcoholic solution is such that one molecule of antipyrine used corresponds very exactly with one molecule of iodine. If to 20 Cc. of a solution of antipyrine (1 Gm. per 100 Cc. of alcohol) we add 20 Cc. of a solution of bichloride of mercury (2.5 Gm. per 100 Cc. of alcohol), and then, drop by drop, a solution of iodine (at 1.351 Gm. per 100 Cc. of alcohol) until the appearance of a persistent faint-yellow color, showing an excess of iodine, the number of Cc. of iodine used, multiplied by 5, will give the number of grammes per cent. of pure antipyrine in the sample under examination. Inversely the amount of iodine present in any sample can easily be estimated.—Chem. News, March 25, 1898, 141; from Jour. de Pharm. et Chim., 1898, No. 4.

Pyramidon—A Methyl-Derivative of Antipyrine.—Lèpine is unable to confirm Tilehne's statement that the new methyl derivative of antipyrine, which is introduced under the name of "pyramidon" possesses greater therapeutic activity, and has more lasting effect, than does antipyrine itself. He finds it but slightly active, and it does not diminish the quantity of urine excreted, but in large doses increases it. The new remedy is a white powder, and is but slightly less soluble than antipyrine.—Pharm. Journ., Oct. 2, 1897, 299; from Rev. de Therap., cxxxii., 427.

Hydroxylamine and Hydrazine—Volumetric Estimation in Presence of Other Oxidizable Substances.—K. A. Hofman and F. Kuspert, in view of the fact that the volumetric methods heretofore used for the estimation of hydroxylamine and hydrazine cannot be applied to their estimation in the presence of other oxidizable substances, propose a method that is free from this objection. It depends upon the use of ammonium metavanadate in dilute sulphuric acid as an oxidizing agent and measuring the liberated nitrogen. By titrating the remaining solution with permanganate, and so determining the amount of vanadate reduced to vanadyl sulphate, the results can be further controlled. The operation is best conducted in a fractionating flask provided with a separating funnel and a tube for the introduction of carbon dioxide, the exit tube of the flask being connected with an azotometer. The reaction proceeds quantitatively at 60° C. according to the following equations:

$$2NH_3O + O = N_2 + 3H_2O.$$
$$N_2H_4 + 2O = N_2 + 2H_2O.$$

Since hydrazine requires for oxidation twice as much oxygen per molecule as hydroxylamine, mixtures of the salts of these substances can also be analyzed. The results given by the author are very satisfactory.—Pharm. Rev., April, 1898, 145.

Phenylhydrazine—Method of Estimation.—Causse recommends for the estimation of phenyldrazine that 0.20 Gm. of the hydrochloride be placed in a 500 Cc. flask, and 60 Cc. of a special solution of arsenic added. (This solution is made by adding 125 Gm. of arsenic acid to 450 Gm. of water and 150 Gm. of HCl, filter, and make up to a liter with glacial acetic acid.) The flask, fitted with a vertical condenser, is gently heated; after 40 minutes add 200 Cc. of water, neutralize with soda until distinctly alkaline to phenol phthalein, re-acidulate with HCl, and add, when cold, 60 Cc. of bicarbonate of soda (saturated), 3 to 4 Cc. of starch water, and titrate with a decinormal solution of iodine (1 Cc. = 0.0127 I).—Chem. News, May 22, 1898, 252; from Bull. Soc. Chim. de Paris, Series 3, vol. xix.–xx., No. 4.

Phenylhydrazine—Compounds with Metallic Acetates.—Moitessier has succeeded in preparing compounds of phenylhydrazine with metallic acetates which are analogous to those formed by the chlorides, bromides, and other salts of the same group of metals. A mixture of phenylhydrazine in alcoholic solution and the powdered metallic acetate is simply heated on a water-bath for a short time, when, upon cooling, crystals of the compound are gradually deposited. These bodies are all soluble in water, alcohol and chloroform, but insoluble in ether, and they lose a small portion of the phenylhydrazine at 100° C.

Zinc Phenylhydrazine Acetate, $(C_2H_3O_2)_2.Zn.2(C_6H_5N_2H_3)$, thick rhomboidal tablets melting at about 135° C.

Cadmium Phenylhydrazine Acetate, $(C_2H_3O_2)_2.Cd.2(C_6H_5N_2H_3)$, occurs in very long prismatic needles, crystallizing in radiating masses. It melts at 121° C, failing somewhat below that temperature.

Manganese Phenylhydrazine Acetate, $(C_2H_3O_2)_2.Mn.2(C_6H_5N_2O_3)$, crystallizes in clinorhombic prisms, melting at 97° C.

Cobalt Phenylhydrazine Acetate, $(C_2H_3O_2)_2.Co.2(C_6H_5N_2O_3)$, is very slowly deposited in the form of joined prisms and radiating masses of a rose-violet color.

Nickel Phenylhydrazine Acetate, $(C_2H_3O_2)_2.Ni.3(C_6H_5N_2O_3)$, is obtained in bluish-green prisms which turn yellow at 140° C., then brown, but do not melt at even 260° C. The nickel salt is noteworthy, since, like the nitrate and iodide of the same metal, it forms a combination richer by one molecule of phenylhydrazine than the other similar compounds of this group of metals.—Pharm. Journ., Nov. 27, 1897, 457; from Compt. rend., cxxv.

Phenylhydrazine—Compounds With Metallic Nitrates.—According to the observations of Moitessier, phenyl-hydrazine unites with the nitrates of the metals of the magnesium group, produces crystalline compounds which give the reactions of both their constituents. By mixing alcoholic solutions of cobalt nitrate and phenylhydrazine in proportion of one mol. of the nitrate to two or three of the latter, a precipitate of the double compound is obtained in minute stellate groups of crystals. The zinc compound, $Zn(NO_3)_2.3(C_6H_5N_2H_3)$ is at first precipitated contaminated with zinc oxide, from which it is freed by crystallization from boiling alcohol, forming pearly crystals resembling boric acid in appearance. The cadmium compound closely resembles the zinc compound, while the nickel salt—$Ni(NO_3)_2.4(C_6H_5N_2H_3)$, crystallizes in small rhomboid lamellæ.—Pharm. Journ., Aug. 28, 1897, 189; from Compt. rend. cxxv, 183.

Basic Phenylhydrazine Hydrochloride—Formation and Characters.—Schmitz-Dumont has observed that when phenylhydrazine and carbon tetrachloride are mixed at ordinary temperatures, a separation of brilliant silky needles occurs. If the mixture be warmed, small pearly scales are obtained which are very soluble in water and are at the same time decomposed in that liquid, giving off small bubbles of nitrogen. These crystals are two isomeric forms of the same substance, basic phenylhydrazine hydrochloride. $(C_6H_5NH.NH_2)_2HCl$. Ether, chloroform and other solvents remove the phenylhydrazine from combination. The salt is very volatile at 100° C., and at 195° C. it decomposes entirely without melting.—Chem. Zeit., xxi, 511.

Lorenit—An Isomer of Loretin.—Claus and Kaufmann describe lorenit, which is "para-iodo-ana-oxyquinoline orthosulphonate," and an isomer of loretin. It occurs as yellow anhydrous needles or leaflets, and is more soluble in water than loretin, and fully as permanent either dry or in solution. The authors also describe a new series of salts of

Loretin, which is "meta-iodo-ortho-oxyquinoline-ana-sulphonic acid," viz.:

Calcium Loretinate, Neutral.—An orange-red, crystalline compound, difficultly soluble in water, insoluble in alcohol, ether, chloroform, or benzene.

Calcium Loretinate, Basic.—Fine, cream-colored needles, forming when dried an extremely soft, impalpable, anhydrous powder. It is practically insoluble in cold water.

Strontium Loretinate, Neutral, resembles in the main the corresponding calcium salt, but contains only one molecule of water of crystallization, and its orange-red crystals are appreciably more soluble in water.

Strontium Loretinate, Basic, corresponds with the basic calcium salt in every particular.

Barium Loretinate, Neutral, contains 2½ mols. of water of crystallization, which it loses completely only at 130° C. It is decidedly more soluble in water than any of the before-mentioned salts, and crystallizes in long, thin, orange-colored needles of a silky lustre.

Barium Loretinate, Basic, occurs in small, fine, extremely delicate needles of a greenish-yellow color. The salt is slightly soluble in water and contains 1 mol. H_2O.

Magnesium Loretinate, Neutral, cannot be made by double decomposition, as are the before-mentioned salts, on account of its solubility in water. It, in fact, crystallizes only from concentrated solutions, but is difficult to obtain because of its easy decomposition. The crystals are salmon-colored, opaque, and generally well-formed prisms.

Magnesium Loretinate, Basic, on the other hand, is very easily obtained by double decomposition between an alkali loretinate and a magnesium salt. It forms opaque, shining, bright yellow crystals, that exhibit decided pleochroism.—Pharm. Ztg., 1897, 537.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Salicin—Halogen-Substitution Products and Derivatives.—Operating with salicin of ascertained purity, Dr. H. L. Visser has prepared and studied the characters of a number of halogen-substitution products and derivatives of salicin.

Monochlorsalicin, $C_{13}H_{17}ClO_7 + 2H_2O$, was obtained, according to the method of Piria, by treating finely-divided salicin suspended in water with chlorine at the ordinary temperature. It forms white, glistening, needle-shaped crystals, melting at 154° C., easily soluble in water and alcohol, particularly when heated, but nearly insoluble in ether. It is not affected by ferric chloride, but is reddened by concentrated sulphuric acid. By treatment of its aqueous solution with lead acetate, followed by ammonia to alkalinity,

Lead-Chlor Salicin, $C_{13}H_{13}Pb_2ClO_7$, is obtained in form of a white precipitate. By boiling chlorsalicin with 5 parts of acetic anhydride for two hours, it is converted into

Tetra-acetyl-chlorsalicin, $C_{13}H_{13}(C_2H_3O)_4ClO_7$, a colorless crystalline compound, m. p. 142° C., sparingly soluble in water, more readily in alcohol. By treating chlorsalicin with emulsin according to the method of Piria,

Chlor-saligenin, $C_6H_3Cl.CH_2.OH.OH$, was obtained in form of large, pearly-glistening crystals, m. p. 93° C.. easily soluble in water, alcohol and ether. It gives a blue color with ferric chloride, and a green color with concentrated sulphuric acid. Upon oxidizing chlor-salicin with potassium dichromate and sulphuric acid,

Chlorsalicylic aldehyde, $C_6H_3Cl.COH.OH$, was obtained, chlorsalicylic acid being formed at the same time. It formed long colorless needles, m. p. 99° C—evidently soluble in water, alcohol, and ether—and giving an intensely blue color with ferric chloride. The oxime of this aldehyd,

Monochlor salicylaldoxime, $C_6H_3Cl.CH:N.OH.OH$, was prepared by reaction between equivalents of the aldehyde, hydroxylamine and sodium carbonate. It was obtained in form of white, needle-shaped crystals, m. p. 122° C., and convertible by boiling with acetic acid and anhydride into an acetylated nitrite which, upon saponification with potassium hydrate, yielded *metachlor-salicylic acid*, m. p. 167° C.

Chlorsalicylic Acid, $C_6H_3Cl.CO.OH.OH$, which was obtained as a by-product in the preparation of chlor-salicylaldehyde, constituted white, needle-shaped crystals, m. p. 167°–168° C., and giving a blue violet color with ferric chloride. It is evidently identical with meta-salicylic acid.

Monobromsalicin, $C_{13}H_{17}BrO_7+2H_2O$, was obtained by the action of bromine upon salicin by a method similar to that by which monochlorsalicin was obtained. It constitutes colorless, glistening needles, soluble in water and alcohol, insoluble in ether, and melting at 170° C. The same substitution compounds as were prepared of the chlorine derivative were prepared with the bromine derivative—viz:

Tetracetyl-bromsalicin, *bromsaligenin*, *bromsalicylaldehyde*, *monobromsalicylaldoxime*, and *bromsalicylic acid*—and they possessed in essentials the same characteristics. The same is true of

Monoiodsalicin, $C_{13}H_{17}IO_7+2H_2O$, which was obtained, similarly to the chlorsalicin and bromsalicin, in the form of white needles, easily soluble in alcohol and in ether. The various derivatives are here also described, and as in the case of the other two, the iodine atom occupies the *meta-position* in the iodsalicin, the iodsalicylaldehyde, and in the iodsaligenin. —Arch. d. Pharm. No. 7 (Oct. 15) 1897, 544–560.

Pseudobaptisin—A New Glucoside from Baptisia Root.—In connection with his investigations of the constituents of the root of *baptisia tinctoria*, R. Br. (which see under "Materia Medica"), Dr. Gorter subjected some *baptisin* made by Merck to closer examination, but found it to differ in essentials from the glucoside which he had succeeded in isolating from baptisia roots of authentic source, and which he had named baptisin. It is, therefore, quite possible that commercial baptisia roots are derived from different species of *baptisia*, a question which remains to be determined. The "Baptisin, Merck" was obtained by extracting the roots with boiling alcohol, distilling off the alcohol, diluting the residual extract with water, precipitating the baptisin with tannin, and decomposing the precipitate with lead oxide. From this the "pseudobaptisin" was obtained by re-crystallizing, first from dilute alcohol, then from hot water, and finally again from diluted alcohol. It was so obtained in form of white, delicate, tasteless, crystalline needles, which proved to be devoid of nitrogen, having in the anhydrous condition the composition $C_{27}H_{30}O_4$, and then melting at 247°—248° C. When crystallized from diluted alcohol it contains either 7½ or 4 mols. of water of crystallization, and if then dried over sulphuric acid it still retains 1½ mols. It dissolves in this condition with the greatest ease in cold methyl alcohol, and is soluble also at their boiling temperatures in water, 50 per cent. alcohol and acetone, but insoluble in these solvents at the ordinary temperatures, as well as in cold benzene, chloroform and ether. Its relation to methyl alcohol is remarkable, since, though soluble in it with the greatest ease, it is on standing again deposited in the form of a crystalline compound,

Methyl-alcohol Pseudobaptisin, $C_{27}H_{30}O_{14} + 1\frac{1}{2}H_2O + CH_4O$, which, when dried over sulphuric acid, loses both the water of crystallization and the methyl alcohol completely. In this anhydrous condition pseudobaptisin is insoluble not only in water, chloroform, and acetic ether, but also in methyl alcohol; water dissolving a little of it only after prolonged boiling. By hydrolysis with 10 per cent. sulphuric acid, pseudobaptisin is split into two sugars yielding glycosazone and rhamnosazone when heated with acetate of phenylhydrazine, and into

Pseudobaptigenin, $C_{15}H_{10}O_5$. This is a white crystalline body, insoluble in cold water, acetone, methyl alcohol, and alcohol, but soluble in hot acetone and methyl alcohol. This, by the action of boiling 5 per cent. soda solution, yields *baptigenetin* and *formic acid* under conditions which require further study.—Ibid., No. 7 (Oct. 15, 1897), 494–503.

Santonin—Qualitative and Quantitative Determination.—K. Thaeter, after reviewing various methods that have been proposed for the quantitative determination of santonin in the flowers of *artemisia maritima*, suggests the following as giving the most satisfactory results: The coarsely-powdered flowers are extracted for 12 to 18 hours with ether in a Soxhlet apparatus. The residue of extraction, after complete evaporation of the ether, is boiled with freshly-prepared milk of lime for about an hour, whereby the resinous constituents are converted into an insoluble lime soap, while the santonin is converted into the soluble calcium salt. The magma is extracted twice with hot water, filtered hot, and the dark yellow filtrate boiled with sufficient solution of aluminum acetate to remove some resinous matter that has entered into solution as well as the coloring matter. The concentrated liquid (filtrate? Rep.) now contains free acetic acid, santonin and calcium acetate. It is treated with an excess of magnesium oxide, which neutralizes the free acetic acid, but does not combine with the santonin to form a salt, as determined by the experiments made. The magma is now evaporated to complete dryness at 105° C. during 2 or 3 hours, is reduced to a dusty powder, and this is extracted during 4 or 5 hours in a Soxhlet tube with anhydrous ether, which must be free from acid. Upon the complete evaporation of the ether, and under the precaution to conduct the final extraction, evaporation, etc., protected from light, pure colorless santonin is obtained, the percentages in three samples of the flower being 2.26, 2.43 and 2.78 per cent. The process is simple and reliable if the following precautions are observed: 1. The ethereal extract of the flower must be boiled with the milk of lime for at least an hour so as to insure the complete combination of the santonin and lime. 2. The neutralization with magnesium oxide must be immediate, so as to insure the complete removal of the free acetic acid. 3. The mass must be reduced to absolute dryness, so that a dusty dry powder is produced for the final extraction. 4. The presence of water or acid in the ether used for the final extraction must be carefully avoided. The author also, after briefly describing the official and other methods for the

Qualitative Determination of Santonin, recommends the following as being very characteristic and useful. It is a color reaction produced when santonin is treated with furfurol and concentrated sulphuric acid, and is carried out as follows: 2 to 3 drops of an alcoholic solution of santonin are mixed with 1 to 2 drops of a 2-per-cent. alcoholic furfurol solution in a flat porcelain capsule, and 2 Cc. of concentrated sulphuric acid are then added. Upon heating the mixture in a water-bath, a purple-red color is developed after the alcohol has evaporated; this changes to a carmine-red, followed by blue-violet and deep dark blue, ending finally in a black precipitation. The different colors are sharply defined and are characterized by considerable permanence, the final black color and precipitate appearing only after two hours' continuous heating. The reaction is quite sensitive, and takes place even in the presence of 0.0001 Gm. While similar color reactions are produced under the same treatment and reagents with other substances—such as α-naphthol, β-naphthol, veratrine, picrotoxin and piperin—these are readily distinguished from the santonin reaction, either in the shade or sequence, while none of them produce the final black precipitation. The author observes that commercial furfurol, being usually of a brown color, due to oxidation, should be purified by fractional distillation, so that it may be used only in a colorless condition.—Arch. d. Pharm., No. 6 (Aug. 17, 1897), 401–414.

Santonin—Method of Determination.—Jaworowsky recommends the following method for identifying santonin: One or two centigrammes of the substance are carefully dissolved by the aid of heat in 2 Cc. of sulphuric acid. Two Cc. of a solution of cerium sulphate, containing 1 per cent. of this salt and 2 per cent. of concentrated sulphuric acid, are then added to the warm solution of the substance to be tested, drop by drop, and with constant stirring, when, in the presence of santonin, a cherry-red color will develop. On cooling, this mixture becomes turbid, and if the 8 Cc. of water are added, a violet precipitate results. The mixture is then shaken with amyl alcohol and set aside. The aqueous layer will be colorless, while the amyl-alcohol will be brown, and on addition of phosphorus chloride assumes a violet color.—Pharm. Ztg., 1897, 738.

α-Oxysantonin—Formation and Characters.—By repeated crystallizations of santogenin from hot alcohol, a substance produced in the organisms of dogs and rabbits, which have been given santonin, Jaffé has obtained a new compound which he names α-oxysantonin, and has the composition $C_{15}H_{18}O_4$. It is very difficultly soluble in boiling alcohol, or in chloroform, and crystallizes from them in colorless, transparent tables, but is easily dissolved by hot acetic acid, from which it crystallizes on cooling in shining scales. From alkaline solutions it is precipitated in form of fine needles. Two isomers, *β-oxysantonin* and *γ-oxysantonin* also appear to exist.

β-Oxysantonin was isolated from the urine of the rabbit by saturation with ether, while

γ-Oxysantonin was obtained from *artemisia maritima.*—Pharm. Centralh., *38*, 351.

Strophanthin—Presence of Alkaloids in the Commercial Product.—The presence of small quantities of a nitrogenous body in commercial strophanthin, which was first noticed by Castillon in strophanthus seeds, has induced H. Thoms to undertake investigation, from which it appears that the seeds of *strophanthus hispidus*, as well as those of *s. kombé*, contain, in addition to strophanthin, the two bases *choline* and *trigonelline.* The separation of these bases from strophanthin is best effected by precipitating the aqueous solution of the mixed bodies with ammonium sulphate instead of with tannin, as is usually the case. The strophanthin thus precipitated is then purified by several treatments with alcohol and ether, and finally obtained as an amorphous body, perfectly free from nitrogenous bodies, which he hopes to obtain eventually in a crystalline form.—Pharm. Journ., April 2, 1898, 323; from Berichte, *31*, 271 and 404.

Strophanthin—Doubt as to Glucosidal Character.—Kohn and Kalisch have made some investigations of strophanthin, which inclines them to accept Arnaud's formula, $C_{31}H_{48}O_{12}$, as being correct. They, however, doubt the correctness of Fraser's view that strophanthin is a glucoside; for, although its hydrolyzed solution reduced Fehling's solution, they were unable to obtain a characteristic reaction for glucose.—Apoth. Ztg., 1898, 232; from Ber. Pharm. Ges., 1897, 514.

Strophanthin—Products of Hydrolysis.—F. Fiest communicates the results of an investigation of strophanthin and strophanthidin which differ in many respects from the results of other observers. The strophanthin was obtained in the form of a partly crystalline mass, absolutely free from nitrogen and having no reducing action on Fehling's solution. In a 1 per cent. aqueous solution it was optically inactive, a distinction from Arnaud's strophanthin. It absorbs water freely, but yields up the greater part of it over sulphuric acid or at a gentle heat. Strophanthin which has been dried over sulphuric acid melts at 105°, and corresponds in composition more closely to the formula $C_{32}H_{48}O_{16}$ than to Fraser's formulæ, $C_{16}H_{28}O_8$ and $C_{20}H_{34}O_{10}$. Strophanthin yields very little, if any, glucose on hydrolysis, but gives, in addition to strophanthidin, a white crystalline substance of the formula $C_{13}H_{24}O_{10}$, melting at 207° C., and a sugar of unknown composition.

Strophanthidin has the formula $C_{26}H_{38}O_7 + 1\frac{1}{2} H_2O$. It dissolves in concentrated sulphuric acid, giving a pale brick-red color, but is precipitated white on dilution. It gives no insoluble picrate, does not reduce Fehling's solution, and only slowly decolorizes bromine or sodium permanganate. The derivatives are mostly amorphous and have high melting-points. Strophanthidin is certainly a benzene derivative. It is converted by boiling caustic alkalies into two yellow crystalline compounds of the formula $C_{26}H_{36}O_5 + 1\frac{1}{2} H_2O$, m. p. 294° C., and $C_{24}H_{30}O_3$, m. p. 198.5° C., respectively. By the action of bromine strophanthidin gives $C_{39}H_{51}Br_5O_{10}$, m. p. 126° C., and $C_{38}H_{33}Br_{11}O_4$, m. p. 160° C.—Apoth. Zeit., 1898, 232; from Ber. Pharm. Ges., 1897, 534.

Ouabin—Further Researches.—In continuation of his researches on the glucoside of *strophanthus glaber*, which he has named ouabin, though he regards it to be identical with strophanthin, Arnaud has obtained the glucoside in crystals of three different degrees of hydration, according to the temperature at which crystallization takes place. At ordinary temperatures the compound $C_{30}H_{46}O_{12}9H_2O$ results. The optical rotation of a 1 per cent. aqueous solution is $[a]$ —30°. Its solubility in water is 0.93 in 100 at 14.5° C. It is readily hydrolyzed by heating with mineral acids, forming rhamnose and a red resinoid body. Ferments do not act upon ouabin. Pharm. Journ., Feb. 12, 1898, 139; from Comptes rendus, cxxvi., 346.

Picrotoxin—Chemical Characters and Constitution.—Meyer has found commercial picrotoxin to be variable in composition, but by repeated crystallizations he obtained a compound having a melting point between 199° and 200° C. The pure picrotoxin so obtained constituted glistening white prismatic needles, easily soluble in hot water, in alcohol and in alkalies, and characterized by the intense yellow coloration produced by concentrated sulphuric acid. By prolonged boiling with benzene, or with chloroform, it may be separated into two bodies,

Picrotin, having the composition $C_{15}H_{18}O_7$, and

Pikrotoxinin, a body having the composition $C_{15}H_{16}O_6 + H_2O$. These two bodies are present to the amount of 34 per cent. of the former and 66 per cent. of the latter, and by reuniting them in the proportion of 1 mol. of picrotin and 2 mol. of picrotoxinin by solution in boiling water, he was able to reproduce the original picrotoxin, melting constantly at between 199° and 200° C., having the composition $C_{30}H_{34}O_{13}$.—Pharm. Centralh., July 1, 1897; 420; per Ber. d. D. Chem. Ges., 1897, No. 16.

A New Crystalline Bitter Principle, probably a glucoside, in the leaves and flowers of *daviesia latifolia*, which see under "Materia Medica."

Vanillin.—Some New Derivatives.—A. E. Menke and W. B. Bentley communicate some preliminary observations upon certain derivatives of vanillin, as follows: When chlorine is allowed to act for some time on a solution of vanillin in chloroform, a white crystalline substance is formed, which, after suitable purification and analysis, was found to be *chlorvanillin*, melting point 166° C. If *chlorvanillin* in small quantities be treated with sodium amalgam, *chlorvanilloin* can be obtained, melting point 255° C. We have not yet succeeded in obtaining chlorvanillin alcohol. Fusion of chlorvanillin with caustic potash seems to yield *chlorprotocatechuic* acid, melting point about 235° C. The action of dilute nitric acid in suitable proportion upon vanillin yields three products: a white substance containing nitrogen, almost insoluble in the usual solvents, melting point about 300° C; a yellow compound soluble in hot alcohol, almost insoluble in water, melting point 178° C. to 179° C., and dinitro-guaiacol, melting point 123° C., soluble in water. The substance melting at 178° C. is either nitrovanillin or an addition compound of nitrovanillin and dinitro-guaiacol, and by oxidation with permanganate forms nitrovanillic acid, melting point 214 degrees.—Pharm. Era, April 14, 1898, 544; from Journ. Amer. Chem. Soc.

Vanillin, Heliotropin, etc.—Artificial Production by Ozone.—H. Trillat reports on the advantageous employment of ozone, applied on a commercial scale as an oxidizing agent in the production of *vanillin* from iso-eugenol, *heliotropin* from iso-safrol, and *aubépine* (anisic aldehyde) from anethol. On the manufacturing scale the yield of completed products is found to compare favorably with experiments on the small scale. The fact that the use of chemicals, and therefore the production of by-products, is obviated, is also a great advantage in the process.—Pharm. Journ., May 28, 1898, 506; from Monit. Scientif., 1898, 351.

Barbaloin—Cause of Difference in Composition.—Leger was led to investigate the characters of barbaloin in order to determine the reason why so many different formulas (there are no less than nine) should be given for this substance. He concludes that the discrepancies of different workers are in the main caused by the ease with which aloin is decomposed, particularly in the presence of alkalies, and even of water. As most workers have employed water in their process of extraction, the body which they have ultimately obtained has probably not been pure. In his research the author has avoided the use of water, treating the aloes with acetone containing a little glacial acetic acid. The insoluble residue was impure aloin, a portion of which, however, was removed by the menstruum, to which ether was added, partially precipitating the resins. The ether and part of the acetone were distilled off, leaving a syrupy residue, which in a few days formed a mass of interwoven needles. These, with the crystals insoluble in the first menstruum, were united and purified by two or three recrystallizations from methylic alcohol. The body then has the formula $C_{16}H_{16}O_7H_2O$. From water it crystallizes in cottony-yellow needles, having three molecules of H_2O. With benzoyl chloride it gives dibenzoyl barbaloin, $C_{16}H_{14}(C_7H_5O)_2O_7$, and with acetyl chloride, diacetyl barbaloin, both of which are amorphous tasteless bodies. From the mother liquors of the acicular barbaloin crystals another form separates out on concentration, in the form of short yellow lamellæ grouped in clusters. These proved to be an isomeric barbaloin containing $3H_2O$.—Pharm. Journ., Aug. 28, 1897, 189; from Comptes rendus, cxxv., 188.

Convolvulin—Formula and Derivatives.—Hochnel attributes to convolvulin the formula $C_{54}H_{96}O_{27}$. It splits up with bases into three acids, viz., convolvulinic acid, $C_{45}H_{80}O_{28}$, purginic acid, $C_{25}H_{46}O_{12}$, methylethylacetic acid. The author has prepared the tribromoderivative of convolvulin, as well as the tribenzoyl- and the monoacetyl-derivative of the same.—Pharm. Journ., July 3, 1897, 2; from Berichte.

Toxicodendrol—The Irritant Principle of Rhus Toxicodendron.—According to Pfaff, the irritant principle of *rhus toxicodendron* is an oily body which he names toxicodendrol. It is soluble in ether and alcohol, precipitated from the latter solution by alcoholic lead acetate, and when liberated from its combination with lead possesses active vesicant properties. It is found in all parts of the plant, the stem containing 1.6, the fruit 3.6, and the leaf 3.3 per cent. When applied to the skin it produces intense irritation, after a latent period of from twenty-four hours to seven or nine days, some persons being more easily vesicated than others.—Pharm. Journ., Oct. 2, 1897, 297; from Journ. Exp. Med., through Med. Chron., vii., 377.

COLORING MATTERS.

Natural Coloring Matters—Chemical Characteristics.—In his presidential address to the Society of Chemical Industry, Dr. Schunck gives a very interesting *résumé* of the chemical history of several coloring matters occurring naturally. Thus, the green coloring matter of plants,

Chlorophyll, under the influence of air and light is an extremely fugitive substance, but in apparent inconsistency with the alteration thus caused, it yields under the influence of what are considered to be relatively strong agents, such as mineral acids or alkaline solutions, products of remarkable stability. With strong acids chlorophyll undergoes complete alteration, yielding various definite products, the most important of which is known by the name of

Phyllocyanin. In alcoholic solution phyllocyanin resists the action of air and direct sunlight, and it combines with metallic oxides, yielding remarkably stable and brilliant green compounds. On subjecting the product of the action of strong hydrochloric acid upon chlorophyll to the further action of an alkali, a substance is obtained named

Phylloporphyrin.—This crystallizes in lustrous red needles, and is analogus to a product obtained in the same manner from hæmoglobin, the red coloring material of blood, and known as

Hæmatoporphyrin. Both these substances are remarkably similar; they are of a red color, act the part of weak bases toward strong acids, give off fumes of pyrrol when heated, and in ethereal solution show absorption spectra which are almost identical in number, intensity and in relative position. In composition, also, they are closely related, phylloporphyrin having the composition $C_{16}H_{18}N_2O$, while that of hæmatoporphyrin is represented by the formula $C_{16}H_{18}N_2O_3$. Another example of the formation of coloring substances in plants is the glucoside contained in indigoferous plants, which Dr. Schunck determined many years ago and named

Indican. This substance, when exposed to the action of certain reagents, splits up mainly into indigo and a kind of sugar, and it is remarkable in apparently possessing, like chlorophyll, some of the susceptibility belonging to its vital organic origin. It is very readily decomposed, but with very different results according to the agent by which the alteration is caused. Thus, a water solution of indican when boiled and mixed with an acid yields indigo red instead of indigo blue; but when the solution is heated with alkali before the addition of acid, brown resinous products are formed, having no resemblance to, or connection with, indigo. In every case, however, the products, unlike the parent substance (indican) from which they are derived, are remarkably soluble, and in that respect they resemble the products obtained from chlorophyll in the same way. Dr. Schunck does not attach much importance to the opinion that the formation of indigo in the watery extract of indigoferous plants is the result of fermentation, caused by a peculiar bacterium, being disposed to regard this view as an instance of the prevailing fashion to attribute every thing that we cannot explain to the influence of bacteria.—Pharm. Journ., July 2,4, 1879 62–63.

Green Plant Color — Preservation for Exhibition.—A. F. Woods describes the following method for preserving the green color of plants for exhibition purposes. Air is removed as completely as possible from the surface and intercellular spaces of the plants by immersion in 90 to 95 per cent. alcohol, or an air-pump may be employed. The plants are next immersed in dilute glycerin (5 per cent.), to which a bluish tint has been imparted by means of copper sulphate or acetate. The copper combines with the chlorophyll, forming copper phyllocyanate, which is practically insoluble in any ordinary preservative medium except strong alcohol, and is not affected by light. Any excess of copper salt may be dissolved out by a mixture of dilute glycerin and formalin, which may also be employed with advantage as the preservative medium.—Pharm. Journ., Nov. 27, 1897, 461; from Bot. Gazette, xxiv, 206.

Chlorophyll—Conditions of Its Formation in Plants.—W. Palladine finds that oxygen is essential for the reproduction of the green color of etiolated leaves in greater quantity than is necessary for respiration. Thus when leaves which had been etiolated for forty-eight hours in the dark in a 10 per cent. solution of saccharose, were exposed to the light, immersed in water in a test tube, it was found that the green color was restored most rapidly to those leaves which were in the upper part, in contact with the air, although the light was equally distributed over the whole length of the tube. The action of solutions of various carbohydrates on the formation of chlorophyll was also experimented with. Thus leaves almost entirely free from carbohydrates were obtained by etiolating them in boiled water. A portion of these, when exposed to light, still immersed in water, showed scarcely any development of chlorophyll. When immersed in a 10 per cent. solution of saccharose, however, an intense green color was developed ; raffinose in a 5 per cent. solution acted in a similar manner. Dextrose and fructose gave rise to the green coloration somewhat more slowly, and with galactose, for the first five days, the leaves showed no color ; after then the color developed very rapidly. Dulcite solution, mannite, asparagin, urea, alcohol, and ammonium chloride prevented the formation of chlorophyll, while inulin and tyrosin appear to be neutral in their action.—Pharm. Journ., Jan. 22, 1898, 68 ; from Comptes rendus, cxxv., 827.

Chlorophyll—Similarity in Constitution to Lecithin.—The researches of Stocklasa determine that a great similarity exists between lecithin and chlorophyll, both in constitution and in decomposition products. Chlorophyll cannot be formed without lecithin, while the action of the sun produces both lecithin and chlorophyll. The former accumulates in the leaves, developing phosphorus-containing bodies. Green leaves contain large quantities of phosphoric acid in the form of lecithin and chlorophyll. Stocklasa was unable to obtain the chlorophyllan isolated by Hoppe-Seyler ; he obtains chlorophyll by the process for isolating pure lecithin. In this way he obtained a body which he terms chlorolecithin, a blackish-green crystalline mass containing 3.37 of phosphorus. Chlorolecithin was found to contain choline, glycerin, phosphoric acid, and chlorophyllinic acid ; the coloring of the substance being due to the latter body. This compound is, however, different from the chlorophyllan isolated by Hoppe-Seyler. After numerous tests the author concludes that the formation of chlorophyll depends on the presence of phosphorus ; he also confirms the opinion of Gautier and Molisch, that no iron is contained in chlorophyll or chlorolecithin. Iron plays an important part in the constituents of the cell nucleus, however, since it has been ascertained that this structure is not formed without phosphorus and iron, while chlorophyll contains phosphorus only.—Pharm. Journ., Oct. 30, 1897, 378, 379 ; from Pharm. Zeit. Russ., xxxvi., 419.

Artificial Indigotin — Industrial Production.—O. N. Witt observes that synthetically-prepared indigotin has passed the experimental stage, and is now likely to become a successful rival of indigo. It can be produced at a price comparable with good quality indigo and cheaper than the refined article. There are, moreover, several points in its favor, such as purity of product, fineness of division, etc. While dyeing wool as well as natural indigo, however, synthetic indigotin, through lack of impurity, does not answer so well with cotton until the cotton fibre has been impregnated with certain substances acting as mordants, such as Turkey red oil, glue, albuminoids, etc.; but cotton so treated and dyed has a fine purple shade. Indigo extract and indigo carmine are now largely prepared from synthetic indigotin by preference to refined natural indigo.—Pharm. Journ., Feb. 26, 1898, 183; from Journ. Chem. Ind., xvii., 41.

Artificial Indigo—Comparison with Natural Indigo.—The "Kew Bulletin" (No. 135, 33–35) observes that though the synthesis of indigo (indigotin) was accomplished by Baeyer eighteen years ago, the product has only recently been available in large quantities for manufacturing purposes, and it is offered now at about the value of pure indigo-blue contained in commercial indigo. Sigismund Lange, in the "Chemiker Zeitung," however, points out that the price of artificial indigo is still too high. He further calls attention to the importance of the 2 to 10 per cent. of indigo-red (indirubin, indipurpurin) contained in the better class of natural indigo, and which is said to be absent in the artificial. It appears that the presence of indigo-red causes the proper fixing of indigo-blue on the fibre. This explains why Java indigo, which contains little or no indigo-red, is unsuitable for vat-dyeing. In some of the synthetical formations of indigo-blue a red coloring matter is obtained as a by-product. If, as is suspected, this should prove to be identical with the natural indigo-red, a means will be available for remedying the existing defect in the artificial indigo.—Pharm. Journ., June 25, 1898, 581.

Indigotin—Aniline a Solvent for its Determination in Indigo.—Brandt recommends commercial aniline oil for the extraction of indigotin for the purpose of assay. The extraction is conducted in a Soxhlet apparatus until the reflux solution is colorless. The aniline extract is freely diluted with water and a sufficiency of hydrochloric acid added to convert it into the soluble chloride, which is readily filtered off. The indigotin is collected on a tared filter, washed first with hot water and then with a very little alcohol, and is then dried and weighed. By this method 84.25 per cent. of indigotin was obtained from Java indigo and 67.5 per cent. from a Bombay sample.—Pharm. Journ., Nov. 20, 1897, 446; from Ann. Chim. Analyt., ii., 223.

Indican—Rapid Determination in Urine.—Amann recommends the following rapid method for the determination of indican in urine, which depends upon the oxidizing agency of sodium persulphate: Twenty Cc. of the urine are acidulated with a few drops of sulphuric acid; 5 Cc. of chloroform are then added, followed by the addition of 5 Cc. of solution of sodium persulphate. The test tube is then shaken in such a manner as to divide the chloroform without producing an emulsion, when, on its separation, the indigo formed by oxidation will be found in the chloroform. Approximately the amount of

Scatol in the sample may be estimated from the more or less intensely red color of the aqueous layer, due to the partial oxidation of the scatoxyde.—Pharm. Journ., Oct. 30, 1897, 378; from Rép. de Pharm. (3), ix., 437.

Anthocyan—Function in Flowering Plants.—F. W. Keeble gives a review of recent observations and theories on the function of the red pigments of the floral organs of plants known as "anthocyan." He dismisses, as unsupported by sufficient evidence, the theory that the red pigment acts as a screen to the chlorophyll, preventing its destruction by the action of the sun. On the other hand, he strongly supports Stahl's view, that its main function is the absorption of heat. This accounts for its frequent presence in the calyx, corolla, anthers, and styles of wind-fertilized trees and shrubs, where it can have no purpose in the attraction of insects, as in the poplar, hazel, *rumex*, *poterium*, etc. In the case of the red stigma of the hazel, it may materially promote the growth of the pollen-tubes towards the ovary.—Pharm. Journ., Nov. 27, 1897, 461; from Science Progress, 1897, 406.

Coleopterine—A Red Pigment from Various Insects.—Griffiths has obtained a new red pigment by extracting the elytra of the ladybird, *cocinella septempunctata*, and those of *pyrochroa coccinea* and *lina popuii*, with boiling ether and alcohol and purifying by resolution in alcohol. The new pigment, which the author has named coleopterine, is amorphous, soluble in alcohol, ether, carbon disulphide, and acetic acid. It is decolorized by light, gives no characteristic absorption bands, and has a composition corresponding to the formula $C_7H_5NO_5$.—Pharm. Journ., July 31, 1897, 81; from Compt. rend., cxxiv., 1461.

Sorghin—A New Pigment from Sorghum and Zea Species.—N. Passerini has extracted from the red-spotted leaf-sheaths of *sorghum saccharatum*, *s. vulgare*, and *zea mays*, a pigment which he terms sorghin. It is a transformation product of the natural pigment sorgho-rubin. The red color of the spots is due, in the first place, to this pigment, not directly to bacteria, as has been stated.—Pharm. Journ., April 16, 1898, 366; from Bull. Soc. Bot. Ital., 1897, 195.

Yellow Coloring Matters.—Investigation in Various Tanning Materials.—A. G. Perkin, in continuation of his investigation of tanning materials, with the object of studying the yellow-coloring principles which are so often associated with the tannin in plants, communicates the result obtained with several materials. In Cape sumachs—the leaves of *colpoon compressum* (*osyris compressa*)—he found a yellow crystalline body which resembled viola-quercitrin, yielding quercetin and glucose (yielding apparently *dextrosazone*); but further investigation proved that the substances were not identical, and he therefore proposes the name

Osyritin for the yellow-coloring matter of Cape sumach. The tannin with which osyritin is associated was found to be a glucoside, and to closely resemble quinotannic acid and quinovatannic acid.

A study of the coloring principles of the two varieties of commercial catechu—namely, gambier and acacia catechu—confirms that gambier contains quercetin, as reported by Löwe, and makes it probable that the same coloring matter is present in acacia catechu. The author also confirms the presence of myricetin instead of quercetin in the Venetian variety of sumach (*rhus cotinus*), as reported by Löwe. Exhaustive investigations by numerous methods of "Valonia" (the acorn of *quercus ægilops*), "Dividioi" (the seed-pods of *cæsalpina coriaria*), "Myrobalans" (the unripe fruit of *terminalia chebula*), "Algorobilla" (the seed pods of *cæsalpina brevifolia*), "pomegranate rind" and "gall nuts" showed these products to depend, either directly or indirectly, upon ellagic acid alone for their dyeing properties, and that they contained no member of the quercetin or allied series. The author, furthermore, points out the intimate connection between the coloring matters and the tannin matters in the materials examined, for, on decomposition, the same acid, and in some cases, the same phenol, was obtained from both.—Amer. Journ. Pharm., Dec, 1897, 622–624; from Journ. Chem. Soc., Oct., 1897.

Yellow Coloring Matters—Kinds Observed in Various Adulterants of Sicilian Sumach.—A. G. Perkins and P. J. Wood describe an investigation of the leaves of plants which are used for the adulteration of Sicilian sumach (*rhus coriaria*). They find that the leaves of *pistacea lenticus* (*shinia*) contain a coloring matter of the formula $C_{15}H_{10}O_8$, forming an acetyl compound, $C_{15}H_4O_8Ac_6$, crystallizing in colorless needles (m. p. 204–206° C.). As on decomposition this yields gallic acid and phloroglucin, it is identical with myricetin, the coloring matter of *rhus coriaria*. Two tannins appear to be present: one dissolves in ethylic acetate, yields gallic acid on decomposition, and is evidently gallotannic acid; the other is insoluble, and forms acetic acid, phloroglucin, and gallic acid on fusion with alkali. When digested with dilute sulphuric acid, the latter yields a red product resembling the anhydrides of the catechol tannins. The further examination of this tannin is reserved. Shinia leaves contain 11.3 per cent. of tannin, and appear to be a useful tanning agent, though not suitable for the same purposes as sumach.

The leaves and stems of *tamaris gallica* and *t. africana* (*bruca*) contain the same coloring matter. It has the formula $C_{16}H_{12}O_7$, and forms an acetyl compound (m. p. 169–171° C.). Decomposition with alkali gave phloroglucin and protocatechuic acid, and with hydriodic acid quercetin and a molecular proportion of methylic iodide were formed. This substance appears to be a new *methyl ether* of *quercetin*, distinguished from rhamnetin and isorhamnetin by its ready solubility in alcohol. So little of it was available for examination that its absolute purity could not be guaranteed. The tannin (8.4 per cent.) is evidently a mixture of ellagitannin and gallotannin, for both ellagic and gallic acids were isolated as its decomposition products.

The leaves of the *ailanthus glandulosa* contain quercetin. The tannin present (11.9 per cent.) is a mixture of ellagitannin and gallotannin, for both ellagic and gallic acids were isolated. This is a worthless tanning agent; the skin, though stained a deep color, is practically untanned.

The coloring matter of the leaves of *ficus carica*, the common fig tree, though resembling quercetin, could not be identified, as from 2 kilos only 0.08 Gm. of the substance was obtained. It is nearly devoid of tannin (analysis gave 1.6 per cent.), the skin being untanned, though stained a dirty olive color.

Gambuzzo, the stalks of the *rhus coriaria*, contain a trace of myricetin and some gallotannic acid.

Broach leaves are employed in South Africa in place of sumach (*r. coriaria*), and are also replacing the Cape sumach (*colpoon compressum*) *Trans.*, 1897, lxxi., 1132). They contain 19.9 per cent. of a catechol tannin, and they form a valuable tanning agent. The coloring mattter, having the formula, $C_{15}H_{10}O_7$ forms an acetyl compound, m. p. 188°–190° C., and on decomposition yields phloroglucin and protocatechuic acid. It differs from quercetin in its reaction with dilute alkali, forming deep green solutions, and appears to be identical with the coloring matter of *arctostaphylos uva ursi* (which see under "Materia Medica.")

The galls of *pistacia terebinthus* contain a trace of myricetin, whereas, Mangrove cutch (*ceriops candolleana*) is devoid of coloring matter.—Chem. News., May 5, 1898, 208; from Proc. Chem. Soc., April 21, 1898.

Isorhamnetin and Quercetin, the yellow coloring matter of *delphinium zalil*, which see under "Materia Medica."

ALBUMINOIDS.

(Including Toxins and Antitoxins.)

Albuminoids—Formation in the Plant in the Dark.—W. Zaleski discusses the question whether albuminoid substances can be formed in the dark, and records as his conclusions, based upon a series of experiments on sunflower leaves: (1) That the nitrates taken up in the leaves are there decomposed and transformed into other nitrogenous compounds; (2) that this transformation is connected with the access of sugar, which renders possible the passage of nitrates into other compounds, probably of the nature of amides; and (3) that these processes can take place in the dark.—Pharm. Journ., May 21, 1898, 473; from Ber. Deutsch. Bot. Ges., xv., 536.

Albumin—Practical Test to Determine its Value.—Carter recommends the following test to determine the commercial value and quality of egg-albumin: Two Gm. of the albumin are mixed thoroughly with a little water, and then more water is gradually added, with thorough agitation, to bring the volume to 200 Cc. If the albumin is free from coagulated particles, this solution will be clear. One hundred Cc. of it are taken and 35 Cc. of a 1 per cent. pure tannin solution are added to them, together with a pinch of potassium bitartrate. After brisk shaking, 10 or 15 Cc. are thrown on a small filter, and the filtrate divided into two equal parts in twin tubes. To one of these a few drops of tannin solution are added, to the other a little 5 per cent. solution of transparent gelatin. If neither tube show a precipitate the sample is of good quality. If the gelatin solution gives a precipitate, from tannin still being present, it shows that the albumin is weak, either from being overheated, or from admixture with inert matter. If, on the other hand, tannin gives a turbidity, it shows that a gelatin having a higher precipitating power for tannin than egg albumin is present. If the presence of gelatin or other bodies is suspected they may be proved by gradually warming a solution of the sample on the water-bath to 100° C. The whole of the egg albumin is coagulated, while gelatin, dextrin, and other bodies are unaffected, and may be found in the filtrate.—Pharm. Journ. Aug. 28, 1897, 192; from. Journ. de Pharm. [6], vi., 102.

Albumin—Possible Value of Formaldehyde as a Reagent for its Presence in Urine.—E. H. Irvine has made experiments with formaldehyde solution, containing 44 per cent. of gaseous HCOH, which seem to point to its adaptability for determinining the presence of albumin in urine. In preliminary experiments it was shown that formaldehyde solution added to an equal volume of the urine produces no precipitation; but if the urine was mixed with one-third of its bulk of an aqueous solution of ovalbumin (strength not stated), a coagulation was produced in thirty seconds. Heat caused coagulation in the same mixture at once, while nitric acid did so in two to five seconds; the coagulation in both these cases being clotty, whereas in the case of that produced by HCOH it was equally disseminated through the liquid. Experiments made with

Serum Albumin seem to point also to the utility of formaldehyde in arresting persistent bleeding by applying it upon the compress. Upon the addition of the formaldehyde to a blood solution, containing glycerin and ammonia, the fibrin and serum albumin contained in it formed a thick clot in sixty seconds. The same solution remained unaffected by either nitric acid or heat so long as free ammonia was present.—Merck's Rep., Aug. 15, 1897, 492.

Triphenyl Albumin—A Culture Medium for Bacteria.—According to Shimada, triphenyl albumin makes an excellent culture medium for bacteria. The new body is produced by dissolving dry powdered egg albumin in ten times its weight of phenol, by heating for several hours on the water-bath; water is then added, and the flocculent precipitate produced is washed first with alcohol and then with water. It is an odorless and tasteless substance, insoluble in hot alcohol, water, or potash solution, but soluble in phenol, and, like ordinary albumin, subject to fermentation. Its formation results from the replacement of three hydroxyl molecules in the albumin by as many phenyl groups, its composition corresponding to the formula $C_{72}H_{109}(C_6H_5)_3N_{18}SO_{22} + 3H_2O$.—Pharm. Post, 1897 (xxx.), 293.

Milk—Sanitary Filtration.—Clement B. Lowe calls attention to the system of sand filtration of milk employed in several European cities at a central depot after its arrival from the country. The filters consist of large cylindrical vessels, divided by horizontal superposed compartments, of which the middle three are filled with fine, clean sand, sifted into three sizes, the coarsest being placed in the lowest and the finest in the topmost of the three compartments. The milk enters the lowest compartment through a pipe under gravitation pressure, and, after having traversed the layers of sand from below upward, is carried by an overflow to a cooler fed with ice water, whence it passes into a cistern, from which it is drawn into locked cans for distribution. The sand is renewed each time the filter is used. Milk thus treated is not only freed from dirt, but the number of bacteria is reduced to about one-third, while the quantity of mucus and slimy matter retained in the sand is surprising.—Amer. Journ. Pharm., March, 1898, 161; from Med. News, Jan. 8, 1898.

Milk—Effect of Sterilization.—Dr. Wroblewski, in view of the alteration in the taste and color of milk subjected to sterilization, has experimented to ascertain the effect of sterilization on its principal constituents. As a result of his investigations, he finds that milk is so far altered by sterilization that the milk sugar is partly caramelized—a very small amount of lactic acid being also formed—the albumen is coagulated, and the casein partly precipitated, or at least brought into such a condition that it can be readily precipitated by acids. Pasteurization acts in a similar manner, but to a less extent. It is concluded, however, from a chemical point of view, that milk is not rendered less favorable to digestion by being sterilized.—Pharm. Journ., May 28, 1898, 505; from Oesterr. Chem. Zeit., i., 5.

Milk—Preservation by Formaldehyde.—The strongly expressed opposition of Harold Stacy to the use of formaldehyde as a preservative of milk, on the ground that this agent quickly has a most injurious action on mucous membranes, and consequently its use in milk given to infants should be discountenanced, even if present in the minutest amounts, has induced Prof. J. N. Hurty to make some experiments both upon his own person and in the case of a child, which seem to point out not alone that in quantities of 5 drops of the 40 per cent. solution of formaldehyde added to each quart, the milk was not alone harmless, but decided benefits were derived from its use after pasteurized milk had failed to give relief. In the case of the child the use of formol-milk extended over a period of two months; in his own case, he has used formol-milk many times during a year and a half, and found it very efficient as a preventive of fermentation which causes acid indigestion. He is, therefore, inclined to recommend the treatment of milk with formaldehyde instead of by pasteurization. The procedure would be to collect the milk with extreme cleanliness and immediately add the minimum amount of the antiseptic which experiment would dictate. Cooling and bottling would follow.—Amer. Drugg., July 26, 1897, 33.

Milk—Detection of Annatto.—A. Leys proposes a test for the detection of annatto in milk, which may be briefly outlined as follows: The milk is shaken with twice its volume of a mixture of ether 320, alcohol (93 per cent.) 240, water 20, solution of ammonia, sp. gr. 920, 8. The aqueous layer retains the coloring matter. It is separated, and mixed with one-half its volume of a 10 per cent. sodium sulphate solution, to separate casein. The clear decantate is then shaken out with amylic alcohol, the separation of this solvent being facilitated by plunging the test tubes in cold water and gradually raising the temperature to 80° C. On evaporating the amylic alcohol solution, a deep yellow residue is obtained, which is dissolved in a little water containing ammonia and alcohol. Strips of unbleached cotton are placed in this solution, which is then evaporated to dryness. The yellow tinted cotton, after washing, is plunged into a solution of citric acid, when, if annatto is present, it will at once assume a marked rose color.—Pharm. Journ., May 14, 1898, 449; from Journ. de Pharm. 1898, 287.

Milk—New Method for the Estimation of Casein.—G. Deniges recommends the following method for estimating the casein in milk: Twenty-five Cc. of milk is placed in a 200 Cc. matrass; to this is added 5 Cc. of a cold saturated solution of ammonium oxalate, 20 Cc. of $\frac{N}{10}$ solution of mercuric-potassic iodide, 2 Cc. of acetic acid and the whole made up to 200 Cc. with distilled water, and filtered. 100 Cc. of this filtrate is taken, and 10 Cc. of a solution of potassium cyanide (equivalent to the decinormal argentic solution) is added, then 12 to 15 Cc. of ammonia water. Add to this, drop by drop, $\frac{N}{10}$ silver nitrate until the solution is permanently clouded (q). In another vessel place 10 Cc. of the same cyanide solution, 12 to 15 Cc. of ammonia water, 10 Cc. of $\frac{N}{10}$ mercuric-potassic iodide, 100 Cc. of water. Run in the $\frac{N}{10}$ solution of silver nitrate until the cloudiness remains (c); ($q-c$) corresponds to the casein in the milk under examination. In case $q-c$ is higher than 37, it is advisable to dilute the milk by one-half, as the operation is much more sensitive with dilute than with concentrated solutions of casein.—Chem. News, Mar. 4, 1898, 101; Journal de Pharmacie et de Chimie, Series 6, vol. vii., No. 1. (1898).

Casein—Compounds with Iodine.—Compounds of iodine and bromine with albumin have heretofore been described by Loen and by Jendrassick (see also Proceedings, 1897, 741). Analogous casein compounds have now been obtained by A. Liebrecht, viz:

Casein Periodide by heating casein with one-fourth its weight of iodine and extracting the excess of iodine from the resulting brown powder by means of ether. The product contains 17.8 per cent. of iodine—which it contains loosely combined—is a yellow powder, soluble in hot dilute alcohol, and separating from this solution in brown flakes. When the periodide is washed with alcohol and ether, part of the iodide is removed and

Casein Iodide, containing 5.7 per cent. of iodine in permanent combination, remains. This is a white powder, insoluble in most solvents, but like casein, is soluble in dilute alkaline solutions, from which it is again precipitated on neutralization. On treating casein periodide in the manner adopted by Bauman in preparing iodothyrin from thyroid gland, a product resembling iodothyrin,

Caseoiodin was obtained. This contains about 8.7 per cent. of iodine, is soluble in hot dilute alcohol and alkaline liquids, but insoluble in most other solvents. Caseoiodin has been tried as a remedial agent by Professor Kocher with good results.—Pharm. Journ., Oct. 30, 1897, 377; from Berichte, xxx., 1825.

Iodocasein—Preparation by Precipitation.—Lepinois finds that iodine will combine with milk-casein in definite proportions, and suggests that the body formed, being analogous to thyroidin, may prove useful in medicine. To obtain it, a solution of iodine in potassium iodide is added to milk until in slight excess after twenty-four hours' contact, as indicated by the coloration imparted to chloroform. The yellowish-brown coagulation is washed by decantation, suspended in water, redissolved with caustic soda in slight excess, filtered, and reprecipitated from the filtrate by the addition of acetic acid to faint activity. To obtain it absolutely pure, solution and precipitation must be repeated five or six times. It is then washed, first with water, then with alcohol, and finally with ether. The substance thus obtained is pure, and leaves practically no ash incineration. The definite combination of iodine with casein is proved by the determination of the iodine and nitrogen in the five precipitations from soda. These gave remarkably concordant figures, the last three containing a mean of 22.1 of iodine, and 14.1 of nitrogen. Therapeutic experiments with this body are to be made, the results of which will be subsequently published. —Pharm. Journ., Nov. 6, 1897, 416; from Journ. de Pharm. [6], vi., 151.

Iodohemol (Hemol Iodide)—The Efficient Substitute for Potassium Iodide.—According to Prof. R. Kobert, hemol iodide possesses all the therapeutic properties of potassium iodide in a high degree, and is preferred to the latter because the greater part of the iodine ingested with it is not quickly eliminated in the urine, since it must first be surrendered by the albumin compounds which the hemol iodide forms in the body before its elimination is possible. Hemol iodide is a brown powder, and contains 16.6 per cent. of iodine, of which the greater part is in stable chemical combination. It is but slightly absorbed by the stomach, but completely so by the small intestines.—Merck's Rep., July 15, 1897, 436; from Real-Encycl. d. ges. Heilk., vi.

Kephir—Preparation.—After briefly describing the method practiced by the Tartars for preparing kephir by the aid of kephir grains, Dr. Spiva describes the method pursued in civilized communities as follows: The dried grain is steeped in water at a temperature of 30° C. for four or five hours. Having increased three or four times in bulk it rises to the surface. The water is poured off and the grain is washed in distilled water and placed in an earthen or darkened vessel, and boiled milk at a temperature of 20° C. is added to make ten times the bulk of the grain. The mouth of the vessel is covered with several layers of gauze. The vessel is to be shaken every two or three hours. In twenty-four hours the ferment-generator (*zakvaska*) is ready. This is decanted through a sieve, is diluted with about ten times its quantity of boiled milk, poured into bottles, and hermetically sealed. The bottles are to be kept at a uniform temperature of 15° to 20° C., and regularly shaken every two or three hours. This product is called "bottled kephir." In twenty-four hours it is ready for use, and is called "first-day kephir;" in forty-eight hours, "second-day kephir;" in seventy-two hours, "third-day kephir,"—or mild, medium, and strong kephir respectively.—Bull. Pharm., July, 1897, 306; from Diet. and Hygienic Gaz.

Gastric Contents—Chemical Analysis.—Dr. Henry F. Hewes has devised a method of analysis of the gastric contents for use in clinical work, and communicates a description in great detail, from which the following summary may find place here: He observes that the contents of the stomach will contain, in the earlier stage of digestion: 1. The elements of the ingested food, proteids, albuminoids, carbohydrates, fats, mineral and organic salts, and extractives. 2. The acid proteids and acid salts, the products of the combination of the secreted hydrochloric acid with the proteids and mineral salts of the food. 3. The ferments, pepsin and rennin and the rennet zymogen. 4. The products of the action of rennin upon casein. The principal proteids present are the native proteids and the acid proteids. In the later stage of digestion the contents will contain the before-mentioned substances, except the organic salts, and, in addition, free hydrochloric acid and certain organic acids due to the action of the free HCl upon the organic salts of the food. The chemical analysis of the gastric contents is conducted as follows:

1. Reaction tested with litmus.
2. Free acid is tested for with Congo-red.

3. Free HCl is tested for with phloroglucin-vanillin, and if negative or doubtful, with Boas' reagent, ootropæolin, or Töpfer's reagent.

4. Test for lactic acid by De Jong's method.

5. Test for butyric acid.

6. Test for acetic acid.

7. Quantitative estimation of acid contents, as follows: Measure off 10 Cc. of the mixed contents; to this add 2 to 3 drops phenolphthalein solution. To this mixture add decinormal soda solution from a burette, testing a drop of the mixture for free HCl by phloroglucin-vanillin after each addition of the soda. When a drop fails to give the Gunzberg reaction, record the reading of the decinormal solution present when the test was last obtained for the reading for *total free HCl* ($=D$). Continue to add the decinormal solution to the same mixture, testing a drop after each addition with Congo-red paper for free acids and acid salts. Note the reading when the Congo-red ceases to give even a slight brown color. At this point test a drop of the mixture with a drop of $\frac{1}{4}$ per cent. aqueous solution of alizarin. Continue adding the decinormal solution of soda until a drop of the mixture gives a pinkish-purple color with alizarin. Take the reading for the estimation of the *total free acids and acid salts* ($=B$). Now continue to add decinormal soda solution until a pinkish-red color appears permanently in the mixture. The reading at this point indicates the *total acidity* ($=A$.) Subtracting B from A, *gives the total combined acid* ($=C$). Adding D to C, give the *total secreted HCl* ($=E$). Then, subtracting D from B, gives the *total organic acids plus acid salts* ($=F$).

8. Estimation of total organic acids, total acid salts, etc. This is accomplished by the aid of Leo's method, which is explained in detail, and gives the *total acid salts* ($=G$). By subtracting *this* estimate from the total free acids *plus* acid salts, the *total free acids* ($=H$) are determined; and by subtracting the total free HCl (D) from the total free acids (H), the *total organic acids* ($=K$) are ascertained.

9. The test for pepsin is made by placing 50 milligrams of coagulated white of egg in 25 Cc. of the filtrate from the gastric contents at 40° C., and recording the time of disappearance of the egg white. In the absence of pure hydrochloric acid, this must be supplied. If the gastric contents are normal, either naturally or by the addition of acid, a duration of the dissolution of the egg over three hours indicates a diminution in pepsin.

10. The test for rennin is made as follows: 10 Cc. of the filtrate of the gastric contents are neutralized with decinormal NaOH, 10 Cc. of neutral milk added, and a temperature of 38° C. maintained. If rennet be present, casein will form in ten to fifteen minutes.

11. Zymogen, in the absence of the ferment, is determined as follows: To 10 Cc. of the filtrate, made slightly alkaline, add 2 Cc. of a 1 per cent. solution of calcium chloride; then 10 Cc. of milk, and heat at 38° C. If rennet is present, casein will form. It is rare to find a condition in which

rennet or the rennet zymogen is wholly absent, but a marked diminution of these substances is characteristic of certain morbid conditions.

12. If free HCl be absent, estimate the total combined HCl by the Mintz method.

The author's paper is concluded with a record of the analyses of the gastric contents of fifty healthy individuals.—Amer. Journ. Pharm., Jan. and Feb., 1898, 25–44 and 94–109.

Cellulose-Digesting Enzyme—Occurrence in Different Plants.—Dr. F. C. Newcomb records the extraction of a cellulose-digesting enzyme from seedlings of the date and of *lupinus albus*, and from the mycele of *aspergillus oryzæ.* The author's observations do not support the view that this cellulose enzyme is identical with diastase. In all the three cases the enzyme also dissolves starch; but the intensity of action is not the same for starch as for cellulose. The *aspergillus* ferment acts most strongly on cellulose, the date ferment the least rapidly.—Pharm. Journ., May 21, 1898, 473; from Bot. Centralb., 1898, 105.

Digestive Ferments—Substances Antagonistic to Their Action.—F. D. Simons has made experiments to determine the extent to which the digestive action of pepsin and pancreatin are interfered with by certain coloring substances, etc. He finds that peptic digestion is retarded by picric acid, tropæolin 000, and by metanil yellow, and pancreatic digestion by Bismarck brown, oil of cinnamon, and formic aldehyde. Salicylic acid and oil of wintergreen retard peptic digestion in a less degree, whilst both peptic and pancreatic digestion proceed normally in the presence of chrysoidine, saponin, methylene blue, or oil of peppermint.—Journ. Amer. Chem. Soc., 1897, 744.

Gastromyxin—A New Digestive Agent.—Gustav Herites has introduced a product obtained from the mucous membrane of the stomachs of neat cattle—a product which he has named "gastromyxin." It is claimed for this preparation that it yields pepsin when introduced into the stomach, and that it should be used in ailments in which a stimulation of the appetite is desirable.—Pharm. Post, Oct. 24, 1897, 535.

Pepsin—A New Method of Examination.—Until recently, the determination of the actual peptone formed in digestion experiments was troublesome and uncertain, but by the application of a new process, devised by Alfred H. Allen in conjunction with A. B. Searle, this difficulty has been in a great measure removed, so that the rational testing of pepsins has been brought within the range of practical possibilities. The method is based on a reaction which suggested itself to Mr. Allen as an improvement on a plan of precipitating proteids, recently proposed by Rideal and Stewart, which consists in passing a current of chlorine gas through a solution to be tested, filtering off and washing the resultant precipitate, and weighing it after drying at a temperature not exceeding 70° C., or preferably *in vacuo* over sulphuric acid. But in order to avoid the inconvenience attaching to the use of chlorine gas, and the drying and weighing of an unstable precipitate, the process was modified by employing bromine water as a precipitant, instead of chlorine. The precipitate is filtered through asbestos, treated with strong sulphuric acid while still moist, and the nitrogen present determined by Gunning's modification of Kjeldahl's process.

As the results of experiments given by the authors in detail in the "Analyst" (1897, 259), it was found that practically the whole of the nitrogen of gelatin, gelatin-peptone, egg-albumin, syntonin, and the mixed products of the acid-pepsin digestion of egg albumin was thrown down in the precipitate produced by bromine, while bromine produced no precipitate in the acidulated solutions of urea, creatin, creatinine, asparagine, or aspartic acid. Mr. Allen, in applying the bromine process to the examination of the products of proteolytic digestion, suggested by him in the the present paper, observes that it is conveniently combined with the Bömer method of precipitating all proteids but peptones by saturating the solution with zinc sulphate. From the filtrate the true peptones can be precipitated by bromine, while all basic and amido products of digestion remain in solution. The process, which may possibly require modification in the future, is at present carried out by the author as follows:

About 1 Gm. of egg albumen in scales is powdered and treated in a 100 Cc. flask with 20 Cc. of warm water. When the albumen is dissolved, the liquid should be heated in a bath of boiling water to coagulate the albumin, and cooled to a temperature not exceeding 40° Cc.; 0.100 Gm. of the sample of pepsin to be tested should next be added, followed by 25 Cc. of decinormal hydrochloric acid. The liquid is then warmed to 40° C., and kept at that temperature for three hours. A volume of decinormal sodium carbonate solution, exactly equivalent to the acid previously used, is then added, and the liquid heated on the water-bath to 90° C. for ten minutes. It is then cooled, diluted with water to 100 Cc., and passed through a dry filter. The precipitate will consist of syntonin and any unaltered albumin, while the filtrate contains any albumoses and peptones formed. Fifty Cc. of the filtered liquor is now saturated in the cold with powdered zinc sulphate (of which about 60 Gm. will be required), allowed to stand, with occasional agitation, for half an hour, and then filtered. The filtrate is acidulated with hydrochloric acid, and treated with an excess of bromine water. The precipitate is treated, as previously mentioned, with sulphuric acid, etc., and the peptone formed deduced from the nitrogen found by Kjeldahl's process. An allowance must be made for the nitrogen contained in the pepsin employed. The albumoses may be deduced from the nitrogen found in the zinc precipitate, after washing it with a saturated solution of zinc sulphate. They may also be deduced from the nitrogen found by treating the remainder of the filtrate from the coagulated syntonin, etc., by Kjeldahl's process, either with or without previous precipitation with bromine.

The following results were obtained by the above process:

	With acid alone.		With acid and pepsin.	
	Nitrogen.	× 6.3 = Proteid	Nitrogen.	× 6.3 = Proteid.
Total, by Kjeldahl's process on albumen used..	.0986	.621	.0986	.621
Total, by Kjeldahl's process on pepsin used....	—	—	.0106	.067
	0.986	.621	.1082	.688
A. Unchanged albumin (filtered off).............	.0722	.455	Trace	Trace
B. Syntonin (precipitated on neutralizing and boiling)................	.0264	.166	.0387	.244
C. Soluble proteids (by bromine in portion of filtrate from syntonin)..	—	Trace	.0704	.444
D. Peptones (by Br in filtrate from $ZnSO_4$ precipitate)...............	—	None	.0470	.296
E. Albumoses plus pepsin (by difference)........	—	Trace	.0234	.147
F. Albumoses (corrected for pepsin)...........	—	Trace	.0128	.080
Sum of proteids (exclusive of pepsin) *i. e.*, A, B, D and F.............	.0986	.621	.0985	.620

—Pharm. Journ., Dec. 25, 1897, 561–562.

Pepsin—Digestive Power in Presence of Alcohol.—Some years ago C. Symes had conducted a series of experiments with the various pepsins of the market, and incidentally also experimented on the digestive power possessed by pepsin in the presence of alcohol, which then led him to condemn wine or similar alcoholic liquids as a vehicle for this ferment. His observations since then led him to modify the deductions then drawn from his experiments, and he now finds that an alcoholic liquid, such as wine, may be used in preparing a solution of pepsin for medicinal use, and that if properly made it soon becomes active when taken into the stomach in the presence of suitable food. Rectified spirit may also be used as a preservative, and, in connection with dilute glycerin, may be used to the amount of 10 per cent.: an excellent medicinal preparation resulting when freshly-prepared undried pepsin is used, and a little flavoring is added to improve the taste.—Pharm. Journ., Nov. 6, 1897, 398.

Peptone—Presence in Sweet Almonds.—Peptone, which has been repeatedly detected in various vegetable substances, has never been isolated from this source in a pure condition, but in admixtures with albumose. E. Lemport, using phosphomolybdic acid for its detection, has determined it now in sweet almonds. The almonds were extracted without heat, the albuminoids being precipitated with picric acid solution. The peptone mixture was obtained as a yellow mass, readily soluble in water, insoluble in ether or strong alcohol. The respective reactions had a positive result, the filtrate of the ammonium sulphate precipitate giving with tannin a voluminous precipitate, revealing the presence of peptone, together with albumose. In spite of considerable loss, the author obtained 0.25 per cent. of peptone mixture from almonds.—Pharm. Journ., Jan. 8, 1898, 24; from Pharm. Zeit. f. Russl., 1897, 527.

Peptones—Superiority when Produced by Hydrochloric Acid.—Denaeyer's investigations upon peptones produced by different agents lead him to the conclusion that the most effective peptone from a physiological point of view, is the kind produced by the action of hydrochloric acid upon minced flesh, as this contains from 60 to 70 per cent. of true peptone. Next in value is the peptone produced by digesting the flesh with pepsin and tartaric acid, which contains only 35 per cent. of peptone, associated with acid amides resulting from the action of tartaric acid. Of least value is a third kind, produced by the action of steam on minced flesh. This contains chiefly syntonin, which may stimulate digestion, but is not in a condition to be assimilated.—Pharm. Journ., July 3, 1897, 3; from Répert. de Pharm., 1897.

Albumoses—Advantages of Zinc Sulphate as Precipitant in Meat Preparations.—The usual method of determining the amount of albumoses in meat preparations by precipitating with ammonium sulphate has many disadvantages in the course of subsequent operations, especially when the amount of nitrogen in the precipitate is ascertained by Kjeldahl's process, zinc sulphate having previously been suggested by Bömer for this purpose. Baumann and Bömer now find its use in every way advantageous, and quite as efficacious as ammonium sulphate for the complete precipitation of the albumoses. Moreover, the subsequent separation of peptones, meat extractives and ammonium salts can be accurately carried out by precipitation in the filtrate with phosphosodic tungstate in the usual manner.—Pharm. Journ., Feb. 26, 1898, 183; from Zeit. f. Untersuchung der Nahrungs und Genussmittel, 1898, 106.

Ferralbumose—A Peptone-Iron Preparation.—Ferralbumose, a new preparation of peptone-iron, is prepared according to Dokkum by treating chopped meat, deprived of fat, with artificial gastric juice, filtering, freeing the filtrate from albumen, neutralizing with sodium carbonate, again filtering and concentrating in vacuo. The dried albumose so obtained is dissolved in ten parts of water, precipitated with a 10 per cent. solution of ferric chloride and the precipitate dried and powdered. The finished product should contain about 10 per cent. of iron.—Apoth. Ztg., 1898, 101; from Chem. Ztg., 1898, 106.

Pancreatin—Influence of Temperature on its Activity.—E. Choay finds that pancreatin prepared according to the official method of the "Codex" and evaporated at a maximum temperature of 45° C., is markedly inferior in saponifying power to the aqueous extract evaporated *in vacuo* at 38° C., although, if carefully prepared, the official preparation is equally active in proteolytic and in amylolytic power. The saponifying action was determined by the method of Henriot, which consists in allowing the ferment to act upon a solution of monobutyrin of known strength, and then titrating the butyric acid liberated. A commercial specimen of pancreatin examined at the same time was found to be very defective both in proteolytic action, and in its hydrolyzing action on starch, not exerting more than half the amylolytic action of the specimens prepared by the author.—Pharm. Journ., May 28, 1898, 505; from Journ. de Pharm., 1898, 418.

Diastase—Conditions of Formation in Plants.—Prof. W. Pfeffer has experimented to determine the conditions under which diastase is formed in plants. The plants operated on were *penicillium glaucum*, *aspergillus niger* and *bacterium megaterium*. An increase in the amount of sugar in the nutrient material was found always to have the effect of decreasing the production of diastase, but the same result was not produced when the sugar was replaced by some other carbohydrate, by glycerin, or by tartaric acid. Professor Pfeffer regards the arrest in the production of diastase as not a purely chemical or physical phenomenon, but as one of irritation exerted on the organism by solution of sugar of a definite degree of concentration.—Pharm. Journ., Oct. 2, 1897, 299; from Ber. k. Sächsischen Gesell. der Wissenschaften, 1897.

Diastase—Modification of its Action by Alkalies.—Perrat observes that the minute traces of alkaline salts often present in drinking water exert a marked influence in modifying the action of diastase on starch. It does not appear to influence the hydrolysis of the starch, but retards the conversion of the dextrin so produced into maltose and secondary dextrin. The "Codex" directs that ten centigrammes of diastase, mixed with 100 Gm. of starch paste—containing 6 per cent. of starch and maintained at 50° C. for 6 hours—should yield a solution, one volume of which should decolorize five volumes of Fehling's solution, but the official test says nothing of the water to be employed. The author finds that a sample of diastase which more than met the official requirements when distilled water was used in the experiments, failed to answer the test when drinking water containing the usual trace of bicarbonates of the alkaline earths was employed.—Pharm. Journ., Jan. 29, 1898, 88; from Journ. de Pharm. [6], vi., 494.

Diastasic Substances—Production by Means of Taka-Moyashi.—Jokichi

Takamine describes the fungus that is in use in Japan for the production of diastase, where it is known as *moyashi*, and which has been named by Alburg *eurotium oryzæ*. It belongs to the genus *aspergillus*, and is distinguished from ordinary fungus by its remarkable power of generating diastase during its growth. To produce diastatic substances for commercial purposes by its aid, wheat bran is first moistened with water and then thoroughly steamed. After the mass is cooled down below 40° C., a small quantity of taka-moyashi is added and thoroughly mixed. The mass is then taken into a growing-room similar to that of a malt-floor, and spread in a layer varying from one to two inches in thickness. The temperature of the room is kept at about 25° C., and the humidity at above 80 per cent. Inside of twenty-four hours the fungus shows its growth, and the diastatic strength of the mass will steadily increase as the growth advances, until, within from forty to fifty hours, it has reached its maximum; the mass is then taken out of the growing-room, cooled down to the ordinary temperature to check further growth, and is then ready for use in the green state, or may be dried for preservation. It is now called *taka-koji*, and will yield its diastase to water. Its solution may, for the purposes of preservation, be evaporated in a vacuum to a thick syrupy condition, this product having a diastatic power of from 8 to 10 times that of malt extract of a similar consistency. In this condition it may be applied to all such industries as the manufacture of beer, alcohol, etc., performing the important function of converting starch into sugars. From this aqueous extract of taka-koji, the diastatic principle, which has been called

Taka-Diastase, may be obtained by precipitation with alcohol. For this purpose an extract containing about 20 per cent. of solid matter is mixed with four or five times its volume of strong alcohol, which precipitates the diastase with some other albuminoids, while the sugars and other impurities remain in solution. The precipitate, after decantation of the mother liquid and draining by centrifugal force, is pressed and dried, and so obtained constitutes a yellowish-white odorless powder, having a nutty taste, readily soluble in water, non-hygroscopic, perfectly stable in its diastatic power, and capable of converting 100 times its own weight of starch in ten minutes, according to the modified Junck's test.

In this connection the author contributes a paper in which he advocates the adoption of a single standard for determining the value of diastatic substances, and gives the following

Method of Testing Diastasic Substances, which he considers useful as a comparative test until the adoption of such standard. The test solutions necessary for this purpose are: 1. *A standard taka-diastase solution*, containing 1 Gm. of standardized taka-diastase in 100 Cc. 2. *A 5-per-cent. solution of neutral potato starch.* 3. *Solution of iodine*, containing 1 Gm. of iodine and 2 Gm. of potassium iodide in 120 Cc. of water. To carry out the test, eight glasses, having a capacity of about 150 Cc. each and each containing 100 Cc. of the starch solution, are placed into a shallow pan of water at about 40° C. Into the first of these, 1 Cc. of the liquid to be tested is placed; in the others, consecutively, 1, 2, 3, 4, 5, 6 and 7 Cc. of the standard taka-diastase solution. The contents of each glass are stirred with small test-tubes as stirring rods, in quick succession until the starch paste in each tube becomes limpid. A drop is then removed from each on to a dinner plate in the order of the glasses, a drop of solution of iodine is applied, and the drop in each case spread out with the finger to the size of a silver dollar. The drops from the second to the eighth glass will form a colorimetric scale from blue to purple or reddish-brown, and by observing which one corresponds to the color of the drop of the sample being tested, the comparative strength of the latter is at once shown. Several specimens may, of course, be examined under these conditions at the same time.—Amer. Journ. Pharm., March, 1898, 137–143.

Diastasic Products—Necessity for a Standard Method of Estimation.—Prof. J. M. Francis observes that notwithstanding the fact that malt extracts and other products acting as starch digestants have for years been articles of general consumption, the compilers of the Pharmacopœia have not as yet seen fit to incorporate in this work any method for determining either the absolute or relative value of such digestants. This is perhaps due to the difficulty of elaborating a satisfactory test which would be reasonably efficient and at the same time sufficiently simple in application to warrant its use by the average pharmacist. The author is fully aware that most of the methods which have been offered are exceedingly tedious in detail, and even in the hands of the skillful specialist give uncertain results; among such would certainly be included those based upon the use of Fehling's solution or the polariscope. On the other hand, the number of diastasic products is becoming so great, and there is such a variation in their activity, some of them indeed being absolutely worthless, that pharmacists and physicians should be supplied with some test whereby they may gain an idea of the relative value at least of these digestive agents. Such a method the author believes the method of J. F. C. Junck (see Amer. Journ. Pharm., 1883, 289), which has hitherto not received the credit it deserved *because it lacked exactness in detail.* This the author believes he has remedied in the following

Proposed Method—Solution of Digestants.—Accurately weigh out five grams (or any desired amount) of the malt extract and make into solution, measuriug 100 cubic centimeters with distilled water at 40° C. In case of more powerful digestants weigh out a proportionately smaller quantity. If it be a powder, or if a portion is not readily soluble, allow maceration in a warm place for one-half hour.

Iodine Solution.—Prepare a solution by dissolving two grams iodine in 200 cubic centimeters distilled water containing five grams of potassium iodide; adjust to 250 cubic centimeters with distilled water. Add 1½ cubic centimeters of this iodine solution to a sufficient quantity of distilled water to produce 1000 cubic centimeters. Mix well and fill a dozen clear two-ounce vials. Arrange these side by side on a white porcelain plate or white sheet of paper.

Water-bath.—In order to have an even temperature it is best to arrange a metal water-bath containing a perforated rack. Put in the proper measure of water and keep at a temperature of 40° C. by means of lamp or gas burner. We find large, flat-bottomed tubes best suited for containing the starch solution; but four or five wide-mouthed vials answer well.

Starch Solution.—Into a counterpoised beaker or other container of sufficient size, pour distilled water—about 400 Gm.; bring this water to violent ebullition before adding the starch. In the meantime weigh out ten Gm. potato starch, transfer to a small beaker, add fifty cubic centimeters cold water, and stir until all lumps are broken and the starch is suspended in the water. Pour this starch and the water into the boiling water, stirring the latter constantly with a rubber-tipped rod. Rinse out remaining traces of starch, add to the paste in beaker, and continue to stir the latter till a smooth, homogeneous jelly is formed; allow to boil vigorously for fifteen minutes; transfer beaker and contents to the balances; remove stirring-rod and add sufficient distilled water to make 500 Gm. (exclusive of weight of beaker); stir to thorough mixture. Counterpoise each tube or vial and pour into each 100 Gm. of the starch paste; transfer the tubes of paste to the water-bath and allow them to remain until the paste attains a temperature of 40° C.

Performing the Test.—To each tube containing 100 Gm. of paste, at a temperature of 40° C., add the calculated measure of digestant solution, shake vigorously, and replace in water-bath. At intervals of one minute, by means of a minim-dropper, drop two minims of the starch solution into a vial of iodine dilution; note the color produced, and continue until *no change* of tint is produced in a vial standing on a white base and *between* two other vials *to which no starch solution is added.* Note time required.

If the digestion is completed in less than thirty minutes (or any specified time), repeat the test, employing a proportionately smaller measure of the digestant, until the proportion required to digest 100 Gm. of starch paste in thirty minutes is determined. It is hardly necessary to prescribe the amount of digestive solution to be employed in each case, as this is simply a matter of arithmetic. For instance, each tube contains 100 Gm. paste, equal to two Gm. dry starch (two-per-cent. solution). If we dissolve 5 Gm. malt extract in sufficient water to make 100 cubic centimeters, each cubic centimeter will contain 0.05 Gm. malt extract. If we suppose the malt extract will digest ten times its weight, we should employ 100 Gm. starch paste (two Gm. starch) and one-tenth of two Gm. malt extract, equal to 0.2 Gm. or four cubic centimeters of the malt extract dilution. The higher the power tested for, the more dilute should be the solution of digestant.

The temperature of 40° C. is suggested to conform to the U. S. P. pepsin test: 38° C. (body temperature) would be theoretically better.—Bull. Pharm., Feb., 1898, 52.

Diastasic Ferments—Improvements of Junck's Test.—C. C. Sherrard and J. L. Tegarden record the results of experiments made to compare the relative accuracy of the popular test of Junck, the improvement on this test by Roberts, and an improved test suggested by one of them—Mr. Sherrard—for determining the absolute energy of a diastase. In the laboratory this is usually shown by the amount of starch a diastase will completely transform in a given length of time. For quantitative work one-half to one hour is preferable to the short two to ten minute tests, and solutions should be of such strength that the diastase will complete its work within those limits, since at about the end of that time it is claimed that the fluids of the stomach become acid, rendering diastase inert. A starch mucilage is completely transformed when any amount of compound solution of iodine added to any amount of the digested solution will not produce a true color or any of the violet and pink colors characteristic of starch and the erythrodextrins. In Junck's test these progressive changes are shown by adding two drops of the digesting solution from minute to minute, to two ounces of distilled water in uniform vials, and containing two drops of a compound solution of iodine. The achromatic changes shown are: Undecomposed starch mucilage gives a greenish-blue color, and after standing for some time a blue precipitate. Soluble starch, the first product of change, a dark-blue solution, but no precipitate. If the amount of soluble starch and dextrin equals that of dextrin and sugar found, the color will be purple. As the soluble starch disappears, the solution will give a decided red color if dextrin predominates, or faintly red if the sugar is in excess, and when most of the dextrin has also been converted into sugar, the liquid will be nearly or entirely colorless. The amount of the iodine used in this test is about .0018 per cent. In the modified test of Roberts, which is practically the same as Junck's, the iodine solution in the final test contains about .025 per cent., but progressive action is shown by placing a drop of the solution and a drop of the enzymosing liquid upon a white slab or plate. The test of the authors (Sherrard's) differs from both of the before-mentioned in the employment of a very much stronger iodine solution—2 per cent.—and in reversing the operation, removing 4 or 5 Cc. of the digesting solution to a small test tube and adding, say three drops of compound solution of iodine, U. S. P., diluted one in six. This is compared with the same volume of water, to which also three drops of iodine solution have been added. When the first two tests mentioned indicate a complete conversion, the latter test still shows an abundance of erythrodextrin, and with some diastases unconverted starch. From an absolutely achromic standpoint the first two tests are very unsatisfactory, because the iodine solution is too weak and the amount of digested starch solution is not sufficient, though that of Roberts is better than Junck's. Even in their own test the achromic point is not sufficiently defined to be satisfactory from a scientific standpoint. On comparing results, which are given in two tables, the authors find that Roberts' test yielded 2.5 times as much sugar as Junck's, and that their own yields 4.54 times as much. In some cases color reactions at the end of ten minutes would indicate a greater activity of a certain diastase; but vegetable and animal diastases do not act with the same rapidity during the first ten minutes, and it was found that when the digestion was continued until conversion was complete, the apparently more active diastase was in reality inferior to others.—Proc. Mich. State Pharm. Assoc., 1897, 48–55.

Diastasimetry—Investigations Into Methods in Use.—After briefly referring to the different diastasimetric methods that have been proposed and the conditions that may influence the accurate determination of the diastasic value of substances possessing the power of hydrolyzing starch, which determination, in the absence of a positive standard, can only have a comparative value, David L. Davoll communicates the results of a study of the methods of diastasimetry based upon the iodine reaction. The kinds of starches used, the strength of iodine solution, were considered, and the amount of reducing substances present at the end-reaction were determined. At the same time the rule that "the diastasic power is inversely as the time," has been investigated. The experiments made were by Junck's method and by a modification of it, which consisted only in using the iodine solution diluted one-half. In this method no particular kind of starch is specified; but it has been pointed out by G. A. Griesson that the kind of starch has its influence, which is perhaps particularly marked in the iodine method. The time of boiling the starch in making the paste is another factor. The starch solution must be homogeneous, for so long as any particles, within limits, remain unconverted by the diastasic principle, a color will be developed. In the present experiments, the results of which are recorded in the table following, ten Gm. of respective starches indicated were triturated with 30 Cc. of distilled water, the resulting mixture formed into 125 Cc. of boiling distilled water, the mortar rinsed with 25 Cc. of water, and the mixture boiled for about five minutes. During the boiling care must be taken that the contents of the flask be kept in motion, so as to prevent sticking on and breaking the flask. At the end of the test with the solution so obtained, further amylolytic action was checked by passing live steam into the mixture, at the same time quickly raising to the boiling point by means of a burner from the outside and boiling for 3 to 5 minutes. The cooled solution was then accurately diluted to 250 Cc. at 15.5° C., and the sp. gr. taken at this temperature by means of a Mohr balance, in order to ascertain the amount of total dissolved substances. Unless otherwise mentioned, it is to be understood that the starches were commercial samples from reliable sources and fully identified by the microscope before use. Such as were found to be alkaline were suspended in water and made only slightly acid with dilute hydrochloric acid, washed by decantation and finally upon filter-paper with the assistance of a platinum cone and vacuum pump, until no opalescence was caused by silver nitrate. They were then air-dried protected from dust. Moisture was determined by drying to constant weight at 100° to 105° C. Corn starch contained 8.95 per cent.; arrowroot, 12.72 per cent., and potato, 12.102 per cent. The extract of malt was made from new kiln-dried malt, freshly ground. It was prepared daily in small lots, and its constants determined before any change could take place. 150 Gm. of the malt were macerated over night with 400 Cc. distilled water, filtered through a porcelain funnel, and the sp. gr. of the filtrate taken at 15.5° C. with a Mohr balance. From the sp. gr. the total dissolved matter in each 100 Cc. was calculated from the formula, $W = (D - 1000) \times 0.2597$. Owing to the remarkable strength of this extract, it was found necessary to dilute it ten times, and in duplicates of 25 Cc. the amount of reducing substances was determined. From the total reducing substances present after diastasic action the amount due to the malt extract itself was deducted. The reducing substances are stated in terms of maltose and, in the digested starch solution, were determined in duplicates of 10 Cc. taken at 15.5°C. The Fehling's solution was freshly prepared each day and applied under approved conditions. 40 Cc. were diluted with 80 Cc. of boiling distilled water, placed in a beaker immersed in boiling water, and the measured solution run into it. After 14 minutes it was removed from the bath and filtered with the assistance of a vacuum pump, through a Gooch asbestos funnel, thoroughly washed with boiling, well-boiled water, the cuprous oxide dissolved in dilute nitric acid, the nitric oxide fumes boiled off, the solution made almost neutral with sodium hydroxide, 1.5 Cc. ammonia water added, and the copper determined in definite dilution by titration with carefully standardized solution of potassium cyanide, prepared immediately before use. The following are the tabulated results:

	Amount of dilute (1–10) malt extract.	Starch.	Method.	Specific gravity at 15.5° C.	Percentage of dissolved substances. (*)	Maltose formed.	Relation of maltose to anhydrous starch taken.	Starch hydrolyzed to maltose. (†)	Percentage of starch hydrolyzed to maltose. (*)	Total time of digestion to end reaction.
1	10 cc.	Corn containing 91.05 per cent. anhydrous starch.	Junck.	1.0115	81.65	5.3161	58.38 %	5.0389	55.35	27 min.
2	5 cc.		"	1.0144	81.33	4.6071	55.99 "	4.3669	47.96	35.5 min.
3	10 cc.		Junck mod.	1.0124	88.09	4.8107	52.83 "	4.5599	50.08	21 min.
4	5 cc.		" "	1.0104	74.18	4.0055	43.99 "	3.7966	41.69	29 min.
5	20 cc.	Arrowroot containing 87.258 per cent. anhydrous starch.	Junck.	1.0121	88.38	5.9919	68.65 "	5.6795	65.09	38 min.
6	10 cc.		"	1.0129	95.11	5.4922	62.92 "	5.2058	59.66	40 min.
7	20 cc.		Junck mod.	1.0128	93.59	5.4091	61.97 "	5.1271	58.76	22 min.
8	10 cc.		" "	1.0122	89.96	4.7410	54.31 "	4.4938	51.50	36 min.
9	20 cc.	Potato containing 87.898 per cent. anhydrous starch.	Junck.	1.0133	96.6	5.9368	67.54 "	5.6273	64.02	87 min.
10	10 cc.		"	1.0121	88.56	3.0418	34.60 "	2.8832	32.08	Not over in 4.5 hours.
11	20 cc.		Junck mod.	1.0129	93.64	5.8265	66.28 "	5.5227	62.82	81.5 min.
12	10 cc.		" "	1.0116	84.81	5.3563	60.93 "	5.0770	57.75	Not over in 4.5 hours.

(*) Based upon anhydrous starch taken.

(†) Obtained by dividing by the factor 1.055.

In no instance is the time inversely as the amount of malt extract added. But it will be noticed that in all cases where but one-half the amount of extract was used, when compared with the sample where the full amount was applied, although the time is not double, this may be compensated by the small amount of reducing substances formed. It would seem, then, that with the weaker ferment the power was devoted chiefly to the formation of non-reducing substances, like the dextrins, or at least, of substances having but slight reducing power. It would also point to the conclusion that the formation of maltose, in the sample with the more diastase, had begun before all of the starch had been converted to the dextrins, both actions going on at once, thus considerable sugar being formed before the iodine color disappeared. In the sample with the lesser diastase, the ferment power was devoted chiefly to the formation of substances having either no reducing power or less than that of maltose. The iodine end-reaction is so variable that only approximate results can be had; but making some allowance for this, it is worthy of further investigation to ascertain if a certain amount of diastase will not perform a definite amount of work upon a starch molecule, as indicated by the reducing substances formed. The author is engaged in further investigations into methods and in diastase testing, the results of which will be communicated later.—Pharm. Archives, April, 1898, 73–85.

Diastase—Importance of Pure Water in Testing.—P. Terrat calls attention to the fact that, in testing for barley diastase, the use of ordinary water is unsuitable, and may lead to the rejection of really good samples as being inferior. The chief cause of this difference in results is due to the alkalinity of the water, so small a quantity as 0.002 per cent. of sodium hydrate reducing the titration of the diastase to 26 per cent. of what it would be with neutral water.—Chem. News, Jan. 7, 1898, 12; from Journ. de Pharm. et de Chim., 1897, No. 11.

Gelatin—Use as a Hæmostatic.—Carnot finds that a solution of gelatin applied locally acts promptly as a hæmostatic; the clot is rapidly formed and healing by first intention favored. The solution employed contained 5 per cent. of gelatin and 0.7 per cent. of sodium chloride, and was sterilized before use, being applied at the temperature of the body. In cases of rectal hæmorrhage, injections of this gelatin solution were equally efficacious.—Pharm. Journ., Oct. 30. 1897, 377; from Répert de Pharm. (3), ix., 454.

Keratin—A New Derivative.—When horn substance or a solution of pure keratin is treated with sodium nitro-prussiate and soda-lye, and the resulting liquid, which is first red then yellow, faintly acidlated with acetic acid and cooled with ice, a flocculent precipitate rapidly separates on vigorous shaking, and forms, after washing with water and drying with alcohol and ether, a white, loose, micro-crystalline powder, which dissolves readily in mineral acids, in diluted soda-lye, and in an excess of ammonia. The acid solutions are colorless, the alkaline ones yellow; and from the latter the substance is reprecipitated by neutralizing with acetic acid or passing a stream of carbonic-acid gas through them. Its probable formula is $C_4H_6N_4O_2$, and it may hence be considered as a derivative of keratin, $C_4H_7N_3O$, in which one atom of H is replaced by an NO group. With silver the preparation yields a compound having the formula $C_4H_5AgN_4O_2$, which is only slightly sensitive to light when dry, but yields the well-known silver reactions.—Merck's Rep., Feb. 1, 1898, 77.

Antitoxins—Formation as a Protection in Growing Plants.—Dr. H. A. Cummins suggests that the principal purpose served by the formation of antitoxins (alkaloids and others) in plants is to protect them against the action of injurious bacteria in the soil. This is confirmed by the fact that the production of poisonous principles varies in the same species with the nature of the soil. Thus, *cicuta virosa* is said to be not poisonous in the neighborhood of Edinburgh; while the sale of *agaricus campestris* is forbidden in the markets of Italy because of its poisonous properties. The antiseptic principles appear usually to be produced as the result of irritation of the cells caused by the entrance of organisms (bacteria), which produce fermentation of the juices of the plant; the antitoxin then killing the invading organisms.—Pharm. Journ., Jan. 22, 1898, 68; from Proc. Asiatic Soc., Bengal, 1897, p. 15.

Oxyseprine—A New Remedy for Tuberculosis.—Hirschfelder gives the name oxyseprine to an oxytoxin obtained in a similar manner to oxytuberculin by cultivating the sputum of a high fever case. The sputa of various consumptive cases was tested until one was found which gave the best results. He has employed it with advantage in advanced cases of tuberculosis, in which a destruction of the tissues and hectic fever is produced as the result of the presence of various cocci and bacilli. The oxyseprine is used hypodermically in doses equivalent to tuberculin, and the author has repeatedly injected it up to 60 Cc. without producing any ill effects.—Pharm. Ztg., xlii., 326.

Viper Venom—Immunizing Action of Tyrosin.—In the course of his researches on the venom of serpents, C. Thisalix has previously found cholestrin, extracted from biliary secretion, to exert marked immunizing action on the venom of vipers. He now finds that the same property is shared by tyrosin, his experiments having been made with the pure substance obtained by G. Bertrand from a species of *russula*, and also from that derived from the juice of dahlia tubercles, as well as with the dahlia juice itself. The effect of the latter is remarkable, since it is more markedly antagonistic to the serpent's venom than can be accounted for from the amount of tyrosin it contains, and because it is the first (authentic? Rep.) instance in which a vegetable juice has been found serviceable as a vaccine to snake poison. Unfortunately, neither the dahlia juice nor the tyrosins mentioned have the same effect when administered after the poison; in this case death is merely retarded for some hours.—Pharm. Journ., Feb. 26, 1898, 185; from Compt. rend., cxxvi., 431.

Serpent Venom—Bile An Antidote.—In a paper read before the Royal Society of Edinburgh, Prof. Frazer stated that the bile of serpents has the power of neutralizing serpent venom, and that this power is shared, though in a lesser degree, by ox-bile. He had separated the water-soluble part of bile from the alcohol-soluble part, and found it quite equal to the best antivenene in its immunizing effects with regard to serpent venom. The neutralizing action is manifested to a wonderful degree when the bile is injected along with the venom, and to a less extent when it is injected after the venom.—Pharm. Journ. Trans., July 17, 1897, 53.

Lizard Venom—Chemical and Physiological Experiments.—C. G. Santesson communicates the results of some comprehensive experiments made by him in the Physiological Laboratory of the Caroline Institute Stockholm, Sweden, to determine the nature of the saliva of a lizard from Ar zona, *heloderma suspectum, Cope.* These experiments seemed to the author particularly desirable in view of the conflicting statements and expressed opinions concerning the poisonous effects of the bites of these lizards; for while the preponderating evidence of experimenters and observers—Cope, Sumichrast, Boulenger, Fayser, Weir Mitchell, etc.—points to the poisonous nature of the lizard saliva, other authorities quoted—Irwin, Tarron, etc.—have been unable to obtain any positive poisonous results worth mentioning. Indeed, one observer, Shufeldt, who had been bitten by one of these reptiles, and had suffered from severe pains, swellings, etc., refused to attribute the effects produced to a special venom contained in the liquid saliva, pointing out that even the bites of men or cats may sometimes have a poisonous effect; and this opinion of the harmless character of these lizards goes even so far as to permit the little animals to become the playmates of children.

Prof. Santesson describes the method of collecting the saliva, and gives the details of his experiments, which lead him to the conclusion that a venom does exist in the saliva of *heloderma suspectum*, Cope. This venom has effects similar to that of serpents, and is comparable in its virulence to that of the viper, which, while capable of producing death in smaller animals, is not likely to produce death in man. The common symptoms produced in frogs, mice, rabbits—which all died from it—was a paralysis of the nervous system. In the development of the paralysis in frogs, the central nervous system, the brain and the spinal cord were first affected by the venom; but afterwards it also attacked the termini of the motor-nerves in the muscles, producing a complete *curare effect*, while the irritability of the muscular tissues remained unaffected. It appears, furthermore, from the author's experiments, that the principal venomous elements of the heloderma saliva consist partly of nucleiniferous substances, and partly of albumoses. By special experiments, also, it was shown that the aqueous extract from the poisonous gland of *heloderma* and the blood of the animal possessed poisonous qualities. The *heloderma suspectum*, in support of the assertion of a majority of experimenters, especially of Weir Mitchell and Reichert, must therefore be regarded as being a specifically poisonous animal. Its harmlessness is due solely to the fact that the animal is sluggish and not aggressive towards man. — Amer. Journ. Pharm., Aug., 1897, 391–398.

URINARY COMPOUNDS.

Normal Urine — Variations due to Nationality.—Charles Platt communicates a carefully-compiled table showing the normals of urine as observed by him during the past several years; careful records having been kept of all urine analyses, with due attention to age, sex, and health of the individual supplying the sample. The author observes that in the urine normals given in the current text-books of urine analysis, it is in many cases not even attempted to reconcile the "totals" with the figures given for individual constituents. But aside from this, which is due to careless compilation, the great variation in the original figures is due not so much to errors of determination as to failure to secure representative samples for analysis. Normals determined for one nationality, or for one class of one nationality, are commonly applied indiscriminately to all, without regard to fundamental differences in conditions. Thus, the average American's habit of life is not that of the German student; yet it is a fact that the majority of figures given in our text-books have originated with the observations of German professors, working in conjunction with their student assistants.—Amer. Journ. Pharm., Aug., 1897, 411–413; from Journ. Amer. Chem. Soc., *19*, 382.

Urine—Its Analysis a Proper Field for the Pharmacist.—George M. Suttie has written an admirable paper, in which he calls the attention of pharmacists to urine analysis as a proper field of exploitation. He gives in terse language a concise account of the various physical and chemical operations involved, and of the several tests that are considered by him as being both reliable and convenient. The determinations include volume, color, reaction to test papers, odor, specific gravity, sediment, urea, albumen, sugar, chlorides, bile, indican, and acetone. The author believes that a careful study of his paper will enable pharmacists to make all of these determinations satisfactorily, but he suggests in addition that some elementary work—such as Tyson's Urine Analysis—should be part of the operator's outfit.—Bull. Pharm., April, 1898, 148 and 151.

Urine—Preparation, when Viscous, for Microscopic Examination.—

According to G. Michel the organized elements of an albuminous viscous urine are readily separated for microscopical examination by shaking the sample with 40 per cent. of its volume of ether, setting the mixture aside so that complete separation may take place, and decanting the ether upon a watch glass. The residue of evaporation may then be transferred by means of a brush to the slides, and examined under the miscroscope.—Pharm. Post, 1897, 607.

Urine—Necessity of Determining the Total Acidity.—According to Oliviero it is important that the total acidity of the urine be determined in an analysis. Ten Cc. of the urine is operated upon by direct titration, using phenolphthalein as an indicator. The number of Cc. used, multiplied by 0.327, will give the total acidity in terms of phosphoric acid. The total acidity of normal urine in these terms is 1.20 Gm. per liter. If the acidity is expressed in terms of oxalic acid, the normal figure will be 2.50 Gm. per liter; if as sulphuric acid, 1.70 Gm. per liter.—Pharm. Journ., Aug. 21, 1897, 167; from Petit Mon. de Pharm., xlvii., Supp. 2458.

Urine—Action of Formaldehyde.—Cotton has found that diabetic urine mixed with a 40 per cent. solution of formaldehyde for preservation gives a larger reduction of Fehling's solution than is due to the glucose present. Formaldehyde also combines with urea as well as with uric acid very readily when urine is acidified with hydrochloric acid. The uric acid compound remains in solution and can be obtained crystalline by evaporation, while the urea compound is but slightly soluble, and is at once precipitated. C. Goldschmidt has now prepared the urea compound, to which he assigns the formula $C_5N_4O_3H_{10}$. It would appear from this to result from the union of two molecules of urea and three of formaldehyde, with elimination of two molecules of water.—Pharm. Centralh., xxxvii. (1897), 265.

Thoms has since studied the same subject, and comes to the conclusion that the separation of the condensation product of urea and formaldehyde is only partial, and cannot be relied upon for determining the urea. His experiments also lead him to the opinion that the precipitate formed has the composition of methylene urea, $CON_2H_2CH_2$, a more simple product which was previously obtained by Holjer and Ludy (Ibid., 341), by the action of formaldehyde on urea, the authors representing Goldschmidt's compound as originating from combination of two molecules of methylene urea with one of formaldehyde.—Pharm. Journ., July 3, 1897, 3; Ber. D. Pharm. Ges. vi., 161.

Urine—Detection of Acetone.—In 1896 A. Mallat published a method of detecting acetone in urine, which consists of precipitating 100 Cc. of urine with 10 Cc. of subacetate of lead, then distilling a portion of this liquid with caustic soda, then adding to a small portion a solution of iodine and iodide of potassium. On reversing the test-tube once, the presence of iodoform is shown by the smell and the cloudy appearance of the solution, indicating that acetone was present in the urine. This method has now been modified by Bretet in the following manner: He does not treat the urine with subacetate of lead, but he distils it in the presence of tartaric acid; he stops the operation when about one-tenth has been distilled over. Then, in two test-tubes, he makes the mixture of caustic soda and of iodine in iodide of potassium, and thus obtains an absolutely clear and limpid reagent. To one of these tubes he adds the distilled urine under examination, and the second tube he uses as a check. The slightest formation of iodoform causes a cloudiness in the tube, and denotes the presence of the smallest traces of acetone.—Chem. News, Nov. 12, 1897, 241; from Journ. de Pharm. et de Chim. (6), vi. (1897), No. 7.

Uric Acid—Reliable Method of Determination.—Dr. Luff states that of all the published methods for the determination of uric acid, that of Gowland Hopkins is by far the most reliable. It consists in saturating the urine with powdered ammonium chloride, allowing to stand for two hours with occasional stirring, and then filtering. The precipitated ammonium urate is then washed three or four times with saturated ammonium chloride solution, washed off the filter with a jet of hot water, and heated just to boiling with excess of hydrochloric acid. The beaker and contents are allowed to stand in the cold for two hours. When the uric acid separates completely, it is collected and washed with cold distilled water; a correction of 1 milligramme for every 15 Cc. of filtrate should be added to the result. The uric acid is washed off the filter, warmed with sodium carbonate until dissolved, then transferred to a flask and mixed with 20 Cc. pure H_2SO_4. The mixture is titrated warm with $\frac{N}{20}K_2Mn_2O_8$ solution, 1 Cc. of which = 0.00375 Gm. uric acid.—Pharm. Journ., Sept. 4, 1897, 213; from Brit. Med. Journ.

Uric Acid—Modifications of Hopkins' Method of its Determination in Urine.—O. Folin suggests that the ammonium chloride be replaced by ammonium sulphate in Hopkins' method for the determination of uric acid in urine. The precipitate obtained by adding 10 Gm. of ammonium sulphate to 100 Cc. of urine is allowed to settle for two hours, then collected and washed with a 10 per cent. solution of ammonium sulphate until free from chlorine; it is treated with a little dilute sulphuric acid, then with 15 Cc. concentrated sulphuric acid, and titrated with permanganate solution of $\frac{1}{20}$ strength, of which 1 Cc. equals 3.75 milligrammes of uric acid. To the result obtained one milligramme is added as a correction for solubility.—Pharm. Journ., Feb. 18, 1898, 163; from Zeit. Physiol. Chem., xxiv., 224.

Another modification of Hopkins' method is that proposed by Tunicliffe and Rosenheim. It consists in titrating the uric acid with a standard solution of piperidine. The uric acid is precipitated by ammonium chloride, as in the original process, from 100 Cc. of urine, and the precipitated ammonium urate decomposed with hydrochloric acid. The uric acid is then washed on a filter with water (15 to 20 Cc.) until free from hydrochloric acid, dissolved in boiling water, and titrated with 1/20 normal piperidine solution, using phenolpthalein as an indicator, until the purple color is obtained. One Cc. of a 1/20 piperidine solution equals .00425 Gm. piperidine or .0084 Gm. of uric acid.—Ibid. from Brit. Med. Journ., Feb. 5, 1898.

Uric Acid—Interference with Iodide of Starch Reaction.—D. Vitali has experimented to determine the cause of the failure of iodine to give the characteristic action with starch in the presence of urine, and finds that it is due to the action of uric acid. The iodine, acting indirectly as an oxidizing agent, is converted into hydriodic acid, and the uric acid is oxidized to alloxan. The reaction can be shown if a small quantity of iodine is added to a solution of potassium urate. Hydriodic acid and alloxan are formed, and on evaporating the solution to dryness, the latter is reduced to alloxantin, which then gives the murexide reaction.—Chem. Ztg. (Repert), 1898, 81.

Organic Urates—Solubility.—The organic bases forming urates soluble in water are divided into two groups by Dr. K. Goldschmidt. The larger of these are those which form urates that are soluble in *hot* water, including methylamine, benzylamine, nicotine, and tetra-hydro isoquinoline. Among the bases forming urates soluble in *cold* water are piperidine, ethylamine and propylamine; the first of these is poisonous, the propylamine very costly, and ethylamine appears therefore to be the most available for use in the treatment of gout.—Pharm. Journ., July 31, 1897, 81; from Chem. Ztg. xxi, 544.

Urobilin—Detection in Presence of Biliary Pigments.—E. Lèpinois observes that the detection of urobilin is a relatively simple matter, but if biliary pigments are present at the same time it becomes more difficult. The author has simplified the old method by adding a known quantity of zinc chloride, then dilute ammonia—insufficient to dissolve the precipitate formed. It is then filtered, and the alkaline liquid, which has become limpid by filtration, is fluorescent if urobilin is present. Besides being fluorescent, the solution also gives a spectrum in which either normal urobilin (urochrome) or the abnormal urobilin of febrile urines can be detected.—Chem. News, Jan. 7, 1898, 11, from Journ. de Pharm. et de Chim., No. 9, 1897.

Biuret—Preparation from Urea, Characters, Compounds, etc.—Although it is sixty years since the biuret method was discovered, we are still uncertain as to the composition of the purple-colored solution which it produces with cupric sulphate and potash, owing to the difficulty of obtaining a pure crystalline body. After numerous experiments H. Schiff has now produced the red-colored compound in the form of carmine-red needles by mixing pure biuret, potassium hydrate, and moist cupric hydroxide or pure neutral copper acetate. The dry compound takes up CO_2 from the air and becomes blue through separation of copper hydroxide; it is also quickly altered when heated. Its solution in water is strongly alkaline, it is insoluble in alcohol, and is decomposed by acids. Its composition is best expressed by the formula $CuH_2O_22KOH,2C_2H_5N_3O_2$. Compounds with potassium, sodium and mercuric oxide were also prepared.

The preparation of pure biuret from urea was best accomplished by the action of dry hydrochloric acid gas at about 135° C; 45 per cent. of the urea being thus converted into biuret. The separation from the accompanying cyanuric acid was effected by treatment with alcoholic potash, forming potassium biuret, which is insoluble in alcohol, and the biuret is then obtained from the alkaline compound by neutralizing with hydrochloric acid. Pure biuret melts at 192.5° to 193° C, and contains when air-dried 12.2 to 12.3 per cent. of water, corresponding to $8H_2O$. The potassium compound was obtained in the form of large rosettes of needles. —Pharm. Journ., Jan. 29, 1898, 87; from Annalen, *299*, 236.

APPENDIX.

ALPHABETICAL LIST OF NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED BY THE TREASURER FOR ANNUAL DUES OR CERTIFICATES, FROM JULY 1, 1897, TO JULY 1, 1898.

	Annual Dues.	Certificates.
Adamick, Gustave H.....’97–’98	$10 00	
Aimar, Charles P............’97	5 00	
Aird, William........’96–’97–’98	15 00	
Allen, E. Floyd ......’95–’96–’97	15 00	
Allison, William O...........’98	5 00	
Alpers, William C........’97–’98	10 00	
Amend, Bernard G...........’98	5 00	
Anderson, Samuel ....’97	5 00	
Andrew, Edgar C............’97	5 00	
Andriessen, Hugo ....’97	5 00	
Ardery, Lorimer ....’97–’98	10 00	
Argenti, Jerome J. B ....’97	5 00	
Arnold, Charles F ....’97	5 00	
Arny, Harry V..............’98	5 00	
Arrington, Homer H.....’96–’97	10 00	
Atwood, Hermon W. ....’95	5 00	
Averill, William H. .....’97–’98	10 00	
Axness, Ole M ....’97	5 00	
Bailey, Frederick............’98	5 00	
Baird, Julian W ....’98	5 00	
Baker, Edwin ....’98	5 00	
Baker, Maury D.........’97–’98	10 00	
Baker, T. Roberts ....’98	5 00	
Ball, Charles E ....’98	5 00	
Ballard, John W.............’98	5 00	
Balser, Gustavus ....’98	5 00	
Baridon, Louis R............’98	5 00	
Bartells, George C...........’97	5 00	
Barth, George F.............’97	5 00	
Bartley, Elias H.............’98	5 00	
Bassett, Charles H.......’95–’96	10 00	
Bauer, Louis G...’94–’95–’96–’97	20 00	
Baylis, Lewis F..............’98	5 00	
Beal, James H ....’98	5 00	
Beardmore, William A ..... .’97	5 00	
Beasley, William A ....’97	5 00	
Beckmann, Oscar A ’94–’95–’96–’97	20 00	
Behrens, Emil C. L.......’97–’98	10 00	
Behrens, Paul J..............’97	5 00	
Beitenman, William W.......’98	5 00	
Bell, S. Howard. ....’98	5 00	
Belt, Z. James...............’97	5 00	
Benfield, Charles W..........’97	5 00	
Bent, Edward C.............’97	5 00	
Benton, Wilber M...........’98	5 00	
Berryhill, Henry P ....’98	5 00	
Betzler, Jacob...............’97	5 00	
Beyschlag, Charles ....’98	5 00	
Bingham, Charles C......’96–’97	10 00	
Bishop, Samuel E............’97	5 00	
Blackmore, Henry S..........’97	5 00	
Blaikie, William..........’97–’98	10 00	
Blake, James E..............’97	5 00	
Blanding, William O.........’98	5 00	
Blank, Alois ....’97	5 00	
Blumauer, Louis.........’96–’97	10 00	
Bobbitt, James H........... ’97	5 00	
Boeddiker, Otto ....’97	5 00	
Boehm, Solomon .... ’97	5 00	
Amount carried forward	$400 00	

	Annual Dues.	Certificates.
Amount brought forward......	$400 00	
Bohn, Carl H...............’97	5 00	
Bond, John B...............’97	5 00	
Borrell, Henry A............’98	5 00	
Bowen, William A...........’97	5 00	$5 00
Bowron, Walter H...........’97	5 00	
Boyce, Samuel F .....’95–’96–’97	15 00	
Boyd, George W.............’97	5 00	
Boyden, Edward C ....’97	5 00	
Brace, William D ....’96–’97	10 00	
Brack, Charles E ....’97	5 00	
Bradbury, Wymond H. ....’97	5 00	
Bradley, Frank H.........’97–’98	10 00	
Bradley, Theodore J ....’98	5 00	
Brandenberger, Adolph ......’97	5 00	
Braun, Adolf ....’97	5 00	
Braunwarth, Alice L.........’98	5 00	
Brecht, Frederick A ....’98	5 00	
Breck, Frederick W......... ’97	5 00	
Brewer, John W ....’97	5 00	
Briggs, Andrew G ....’97	5 00	
Brisley, Harry ....’97	5 00	
Bronson, George S ....’95	5 00	
Brown, Albert E.............’97	5 00	
Brown, Robert A ....’97–’98	10 00	
Brown, William A...........’98	5 00	
Brown, William T........’97–’98	10 00	
Bruck, Philip H ....’98	5 00	
Bruguier, Francis............’97	5 00	
Brunner, Charles H..........’97	5 00	
Brunner, Norman I ....’97	5 00	
Buchheit, Aug. W...... .’96–’97	10 00	
Bunker, Elihu ....’97	5 00	
Burdick, Frederick R........’97	5 00	
Burg, John D ....’98	5 00	
Burgheim, Jacob ....’97	5 00	
Burnham, Alfred A., Jr......’98	5 00	
Burns, Edward M ....’97	5 00	
Burrough, Horace...........’98	5 00	
Burton, William A...........’97	5 00	
Butler, Charles H..... ......’98	5 00	
Butler, Freeman H ....’98	5 00	
Button, Charles E............’98	5 00	
Byrne, John.................’98	5 00	
Cabell, Henry O.............’97	5 00	
Cambier, Jacob............ ’97	5 00	
Cameron, Donald L..........’97	5 00	
Campbell, Marion J..........’97	5 00	
Carlson, Swan B.............’97	5 00	
Carrell, Eugene A ....’97	5 00	
Carslake, George M......’97–’98	10 00	
Carver, Frank H ....’96	5 00	
Case, Charles H. ....’97	5 00	
Caspari, Chas., Jr............’98	5 00	
Casper, Thomas J ....’98	5 00	
Chabot, David P ....’98	5 00	
Chandler, Charles F..........’98	5 00	
Chapin, Fred. H. ....’97	5 00	
Chapin, William A ....’98	5 00	
Amount carried forward	$730 00	$5 00

	Annual Dues.	Certificates.
Amount brought forward ...	$730 00	$5 00
Chapman, Isaac C ... '97	5 00	
Chapman, William H ... '97	5 00	
Charroppin, Emile L ... '98	5 00	
Cheatham, Thomas A ... '97	5 00	
Christiani, Charles ... '97	5 00	
Christianson, Lars ... '98	5 00	
Church, Merton E ... '97-'98	10 00	
Claflin, Walter A ... '97-'98	10 00	
Clark, James R ... '97-'98	10 00	
Clark, John A ... '97	5 00	
Clinton, Frederick S ... '97	5 00	
Cobb, Ralph L ... '96-'97	10 00	
Coblentz, Virgil ... '97	5 00	
Cole, Howson W ... '97	5 00	
Colen, James A ... '97-'98	10 00	
Collier, William K ... '97	5 00	5 00
Collins, Albert B ... '98	5 00	
Collins, Carrie S. ... '97	5 00	5 00
Collins, Edward S ... '97	5 00	
Cone, John W ... '95-'96-'97-'98	20 00	
Conrad, John ... '95-'96-'97-'98	20 00	
Conrath, Adam ... '98	5 00	
Cook, Thomas P ... '98	5 00	
Coon, James V. B ... '97	5 00	
Cornell, Edward A ... '97	5 00	
Cotton, Robert M ... '95	5 00	
Coupe, Robert E ... '98	5 00	
Cowan, John ... '97	5 00	
Craighead, Gordon G. '96-'97-'98	15 00	
Cramer, Max ... '98	5 00	
Crampton, Ferd. L ... '98	5 00	
Crane, Frank T ... '97	5 00	
Criswell, Francis M ... '97	5 00	
Cronheim, Solomon ... '97	5 00	
Crossman, George A ... '94	5 00	
Crowdle, John E ... '97	5 00	
Culbreth, David M. R ... '98	5 00	
Culver, Anson A ... '97	5 00	
Curry, Alfred M ... '97	5 00	
Curry, David W ... '97	5 00	
Cutts, Foxwell C., Jr ... '98	5 00	
Dadd, Robert M ... '98	5 00	
Danek, John F ... '97	5 00	
Dare, Charles F ... '97	5 00	
Davies, Llewellyn P. . '96-'97-'98	15 00	
D'Avignon, J. Eugene ... '97	5 00	
Davis, Charles L ... '97-'98	10 00	
Davis, Samuel C ... '95	5 00	
Davoll, David L., Jr ... '97	5 00	
Dawson, John H ... '97	5 00	
Day, William B ... '97	5 00	
De Graffe, Bertha L ... '97	5 00	
De Long, Alfred ... '97	5 00	
De Lorenzi, Albert ... '95-'96-'97	15 00	
Dedrick, William F ... '95-'96	10 00	
Delouest, Edward ... '96	5 00	
Dennin, Charles ... '97-'98	10 00	
Dennin, Edwin C ... '97-'98	10 00	
Denning, Michael ... '97	5 00	
Devine, John ... '98	5 00	
Dewender, William H ... '98	5 00	
Dewoody, William L ... '97	5 00	
Diebert, Thomas I. ... '97	5 00	
Diehl, C. Lewis ... '97	5 00	
Dilly, Oscar C ... '97	5 00	
Dinmitt, Addison ... '97	5 00	
Dimock, Robert H ... '98	5 00	
Dixon, J. Marion ... '98	5 00	
Dobbins, Edward T ... '98	5 00	
Dohme, Alfred R. L ... '98	5 00	
Dohme, Charles E ... '98	5 00	
Dolan, Frank L ... '96-'97-'98	15 00	
Donaldson, Joseph C ... '96	5 00	
Donaldson, Pierre A ... '95-'96	10 00	
Dorr, George W ... '98	5 00	
Amount carried forward ...	$1225 00	$15 00
Amount brought forward ...	$1225 00	$15 00
Douglass, Henry ... '97	5 00	
Downing, Benj. F., Jr ... '97-98	10 00	
Drew, Walter T ... '97	5 00	
Driggs, Charles M ... '95-'96	10 00	
Druehl, Frank A ... '97	5 00	
Dubé, J. Edmond ... '97	5 00	
Duble, Jesse B ... '97	5 00	
Du Bois, Wm. L ... '97	5 00	
Duckett, Walter G ... '97	5 00	
Dunn, John A ... '98	5 00	
Dunning, Lyman T ... '97	5 00	
Durban, Sebastian C ... '95	5 00	
Durkee, William C ... '97	5 00	
Dutcher, Alfred L ... '97	5 00	
Eagny, James T. ... '98	5 00	
Earl, Noble C ... '97	5 00	
Easterday, Herbert C ... '97	5 00	
Eberbach, Ottmar ... '97-'98	10 00	
Eberle, Eugene G ... '97	5 00	
Eccles, Robert G ... '98	5 00	
Eckstein, Andrew J ... '98	5 00	
Edwards, Frederick B ... '97	5 00	
Edwards, Nathan W. ... '94	5 00	
Ehrlicher, Henry M ... '97	5 00	
Ekman, N. Adolf ... '97	5 00	
Elfstrum, Axel F ... '97	5 00	
Eliel, Leo ... '97	5 00	
Emanuel, Louis ... '98	5 00	
Emich, Columbus V ... '98	5 00	
England, Joseph W ... '97	5 00	
Eppley, James K ... '97	5 00	
Eschman, Clemens L ... '96-'97	10 00	
Estabrook, Henry A ... '97-'98	10 00	
Esters von Krakau, W ... '97	5 00	7 50
Estes, Joseph J ... '98	5 00	
Etzel, John L ... '97	5 00	
Ewing, John ... '97	5 00	
Eyssell, George ... '97-'98	10 00	
Fairchild, Benjamin T ... '97-'98	10 00	
Fairchild, Samuel W ... '98	5 00	
Farrar, Samuel R ... '96-'97	10 00	
Feemster, Joseph H ... '96-97	10 00	
Feil, Joseph ... '97	5 00	
Fennel, Charles T. P ... '97	5 00	
Fenner, Alexander W., Jr ... '97	5 00	
Fieber, Gustavus A. ... '97	5 00	
Fink, Frederick Wm. ... '98	5 00	
Finley, Arthur C ... '97	5 00	
Firmin, John C ... '96-'97	10 00	
Fish, Charles F ... '95-'96-'97	15 00	
Fisher, George W ... '97-'98	10 00	
Flanagan, Lewis C ... '98	5 00	
Flemer, Lewis ... '97	5 00	
Fletcher, John W ... '98	5 00	
Flexon, Charles ... '97	5 00	
Flint, George B ... '97	5 00	
Ford, Charles M ... '96-97	10 00	
Foster, J. Webb ... '96-'97	10 00	
Foster, William O ... 94	5 00	
Foulke, James ... '97	5 00	
Fox, Peter P ... '98	5 00	
Frames, J. Fuller ... '97	5 00	
Fraser, Horatio N ... '98	5 00	
Freericks, Frank H ... '97	5 00	
Freid, Isadore ... '97	5 00	
French, Harry B ... '98	5 00	
French, John I ... '98	5 00	
Frerksen, R. C ... '94-'95-'96-'97	20 00	
Frohwein, Richard ... '97-'98	10 00	
Frost, William A ... '97	5 00	
Frye, George C ... '98	5 00	
Furl, Irwin W ... '95-'96-'97	15 00	
Gallagher, John C ... '97-'98	10 00	
Galt, Edward P ... '95	5 00	
Gamble, Stewart ... '97	5 00	
Amount carried forward ...	$1710 00	$22 50

		Annual Dues.	Certificates.
Amount brought forward		$1710 00	$22 50
Gammon, Irving P.	'97	$5 00	
Gane, Eustace H	'97	5 00	
Gano, William H.	'97-'98	10 00	
Gardner, Robert W.	'98	5 00	
Gaus, Charles H.	'97-98	10 00	
Gayle, John W.	'98	5 00	
Geisler, Joseph F.	'97	5 00	
George, Charles T.	'97	5 00	
Gessner, Emil A.	'98	5 00	
Gilbert, Charles A.	'97	5 00	
Gill, George	'98	5 00	
Gilpin, Henry B	'98	5 00	
Girling, Robert N.	'97-'98	10 00	
Gleim, John C.	'97-'98	10 00	
Glover, William H.	'96-'97	10 00	
Godding, John G.	'98	5 00	
Good, James M.	'97	5 00	
Goold, Joseph E.	'98	5 00	
Gorgas, George A.	'98	5 00	
Gosman, Adam J.	'98	5 00	
Grace, Wm. D.	'98	5 00	
Graham, Clarence M.	'97	5 00	5 00
Graham, Frank R.	'97	5 00	
Graham, Joseph H.	'97	5 00	
Grassly, Charles W.	'97	5 00	
Gray, Henry R.	'97	5 00	
Gray, William	'98	5 00	
Green, Benjamin	'98	5 00	
Greiner, William E	'97	5 00	
Greve, Charles M.	'97	5 00	
Greve, Theodore L. A	'98	5 00	
Greyer, Julius	'97	5 00	
Griffen, Truman	'97	5 00	
Griffith, Thomas	'97	5 00	
Gross, Edward Z.	'97-'98	10 00	
Guise, P. Nettleton	'97	5 00	
Gundrum, George	'97-'98	10 00	
Haake, William H.	'97	5 00	
Hall, Horace B	'97	5 00	
Hall, William A	'97	5 00	
Hallberg, Carl S. N.	'97	5 00	
Hammar, Alrik	'97	5 00	
Hammel, Joseph,	'97	5 00	5 00
Hancock, Franklin W.	'95	5 00	
Hancock, J. F.	'94-'95-'96-'97-'98	25 00	
Hancock, J. Henry	'97-'98	10 00	
Hannan, Owen B	'96-'97	10 00	
Hardigg, William L	'95-'96-'97	15 00	
Hargrave, Edward T.	'97	5 00	
Harris, Francis M	'97	5 00	
Harrison, Richard H. M.	'96-'97	10 00	
Harrison, William J.	'98	5 00	
Harter, Isaac F.	'98	5 00	
Hartshorn, Frederick A.	'98	5 00	
Hartwig, Otto J	'97	5 00	
Harvey, John M.	'96-'97	10 00	
Hassebrock, Henry F.	'97	5 00	
Hassinger, Samuel E. R.	'98	5 00	
Hatton, Edgar M.	'98	5 00	
Hatton, Eilmore W	'98	5 00	
Hauenstein, William.	'97	5 00	
Haussamen, Henry L.	'97	5 00	
Haussmann, Frederick W.	'98	5 00	
Hawkins, M. Smith	'98	5 00	
Hay, Edward A.	'98	5 00	
Hayes, Horace P.	'98	5 00	
Haynes, David O.	'98	5 00	
Hays, Joseph A	'97	5 00	
Hechler, George L.	'97	5 00	
Heebner, Charles F	'97	5 00	
Heinemann, Otto	'97	5 00	
Heinitsh, Sigmund W	'98	5 00	
Helfman, Joseph	'97	5 00	
Heller, Charles T.,	'97	5 00	
Hemm, Francis	'97	5 00	
Amount carried forward		$2170 00	$32 50

		Annual Dues.	Certificates.
Amount brought forward		$2170 00	$32 50
Hemm, Louis P.	'97-'98	10 00	
Henderson, Archibald K	'98	5 00	
Henry, Frank C	'97	5 00	
Henry, Hubert	'97	5 00	
Hepburn, John	'97	5 00	
Herbst, William P	'97	5 00	
Hereth, Frank S.	'97-'98	10 00	
Hermann J. Geo.	'94-'95'-'96'-97	20 00	
Heseltine, Daniel W	'97	5 00	
Heydenreich, Emile	'98	5 00	
Higgins, Albert W.	'97-'98	10 00	
Hilby, Francis M.	'94-'95'-'96	15 00	
Hill, Frederick J.	'97	5 00	
Hillebert, George A.	'97	5 00	
Hilton, Samuel L.	'97	5 00	
Hinrichs, Gustavus D.	'97	5 00	
Hiriat, Sebastian	'97	5 00	
Hitchcock, John E.	'97	5 00	
Hobbs, William	'97	5 00	
Hoch, Aquila	'98	5 00	
Hoffman, Julius.	'97	5 00	
Hoffmann, Frederick	'98	5 00	
Hogan, John J.	'98	5 00	
Hogey, Julius H.	'95	5 00	
Holgate, Francis H.	'97	5 00	
Holmes, Clay W			5 00
Holmes, Henry E	'97	5 00	
Hood, Charles I.	'98	5 00	
Hopp, Lewis C.	'97	5 00	
Horn, Wilbur F.	'97-'98	10 00	
Hover, William A.	'97-'98	10 00	
Howey, John J	'97	5 00	
Howson, Arthur B	'97	5 00	
Huder, Henry J.	'97	5 00	
Hudson, Arthur	'97	5 00	
Hudson, T. F.	'96- 97	10 00	
Huested, Alfred B	'98	5 00	
Huhn, Charles H.	'97	5 00	
Huhn, George	'96-'97	10 00	
Hurd, John C.	'98	5 00	
Hurlebaus, George W.	'97	5 00	
Huston, Charles	'98	5 00	
Hutton, Harry D.	'97	5 00	
Hydren, Carl	'97	5 00	
Hynson, Henry P.	'97	5 00	
Ingalls, John	'97	5 00	
Ink, Charles E	'96-'97	10 00	
Irvin, William A.	'97	5 00	
Jacobs, Joseph	'98	5 00	
Jamieson, Thos. N.	'94-'95-'96-'97	20 00	
Joergensen, Sophus	'97	5 00	
Johnson, Charles B	'97	5 00	
Johnson, Knute A.	'97	5 00	7 50
Johnston, Henry A	'97	5 00	
Jones, Alexander H.	'98	5 00	
Jones, David F.	'97	5 00	
Jones, James T.	'96-'97	10 00	
Jones, Simon N.	'97	5 00	
Joy, Edwin W	'97	5 00	
Jungmann, Julius	'97	5 00	
Kaczoroski, Adolph O.	'96	5 00	
Kaenter, Frederick W.	'97	5 00	7 50
Kalish, Julius	'98	5 00	
Kauffman, George B.	'98	5 00	
Keefer, Charles D.	'97	5 00	
Keeney, Caleb R.	'98	5 00	
Keith, Irwin A	'98	5 00	
Kellam, Chas. R. J.	'97	5 00	
Kelley, Charles M.	'97	5 00	
Kelley, Edward S.	'97	5 00	
Kemp, Edward	'98	5 00	
Kennedy, Ezra J	'97	5 00	
Kennedy, George W	'97	5 00	
Kent, Henry A., Jr	'97-'98	10 00	
Kettler, Edward, Jr.	'98	5 00	
Amount carried forward		$2630 00	$52 50

	Annual Dues.	Certificates.
Amount brought forward	$2630 00	$52 50
Kiedaisch, John F., Jr. '98	5 00	
Kieffer, George '97	5 00	
Kienth, Hans '96–'97	10 00	
Kilmer, Frederick B. '97–'98	10 00	
King, Campbell T. '97	5 00	
Kirk, James E, '97	5 00	
Kirkland, Derwentwater '98	5 00	
Klayer, Louis '95	5 00	
Klein, Ernst F. '97	5 00	
Klein, Frederick '97	5 00	
Klie, G. H. Charles '97	5 00	
Kline, Mahlon N. '98	5 00	
Klock, George H. '97	5 00	
Knabe, Gustavus A. '97	5 00	
Kneuper, George '97	5 00	
Kneuper, George N. '97	5 00	
Knoebel, Thomas '97–'98	10 00	
Knoefel, Bruno '98	5 00	
Knoefel, Charles D. '97	5 00	
Koch, Julius A. '97	5 00	
Koch, Louis '98	5 00	
Kochan, John '94–'95–'96	15 00	
Koehnken, Herman H. '97	5 00	
Kolb, William W. '97	5 00	
Kraemer, Henry '97–'98	10 00	
Krieger, Philip '98	5 00	
Krueger, Owen W. '97	5 00	
Kyseth, Bernt O. '97	5 00	
Lagrange, John V. N. '97	5 00	
La Pierre, Elie H. '98	5 00	
La Wall, Chas. H. '97	5 00	
Laing, Alfred A. '98	5 00	
Laird, John '98	5 00	
Lamar, Henry J. '97	5 00	
Lampa, Robert R. '97	5 00	
Lanctot, Henri '96–'97	10 00	
Lane, Edward B. '97	5 00	
Lariviere, Telesphore '97	5 00	
Larrabee, John '97	5 00	
Lauricella, Felice '97	5 00	
Layton, Thomas '97	5 00	
Legel, John G. '97–'98	10 00	
Legendre, Joseph A. '97	5 00	
Lehman, Louis '97	5 00	
Lehn, Louis '98	5 00	
Leonhard, Rudolph E. '97–'98	10 00	
Lernhart, August '98	5 00	
Levinson, Joseph '97–'98	10 00	
Levy, Adolph. '97	5 00	
Libby, Henry F. '98	5 00	
Lindvall, Gus '97–'98	10 00	
Lisle, Justin D. '97	5 00	
Lloyd, John U. '97	5 00	
Lockert, Charles L. '96–'97	10 00	
Lockie, James L. '97	5 00	
Loehr, Theodore C. '97	5 00	
Loomis, John C. '97	5 00	
Lord, Frank J. '97–'98	10 00	
Louis, Leopold G. '97	5 00	
Lovis, Henry C. '96–'97	10 00	
Lovvorn, James L. '97	5 00	
Lowd, John C. '98	5 00	
Lowell, Edward M. '98	5 00	
Lueder, Fritz '97–'98	10 00	
Lundberg, John C. '97	5 00	
Lynch, Frank K. '97	5 00	
Lynch, Robert F. '97	5 00	
Lyons, Albert B. '94–'95–'96–'97	20 00	
Lyons, Fred. W. '97	5 00	
Maguire, Eduord S. '97	5 00	
Maine, August '98	5 00	
Majer, Oscar '97	5 00	
Major, John R. '97	5 00	
Mallinckrodt, Edward '97	5 00	
Mann, Albert '97	5 00	
Amount carried forward	$3095 00	$52 50
Amount brought forward	$3095 00	$52 50
Manning, John H. '95–'96–'97	15 00	
Mares, Ferdinand L. '97–'98	10 00	7 50
Markoe, George B. '97	5 00	
Marshall, Ernest C. '97	5 00	
Martin, John C. '97	5 00	
Martin, Nicholas H. '97–'98	10 00	
Mason, Harry B. '98	5 00	
Matthews, Charles E. '98	5 00	
Matusow, Harry '97–'98	10 00	
May, Edward '97	5 00	
May, Eugene '98	5 00	
May, James O. '97–'98	10 00	
McClearn, Henry T. '97	5 00	
McDonald, George '97	5 00	
McElhenie, Thomas D. '97	5 00	
McFarland, Robert M. '97	5 00	
McGeorge, William '97–'98	10 00	
McIntyre, William '97–'98	10 00	
McKesson, John, Jr. '98	5 00	
McMahon, Joseph '97–'98	10 00	
McMonies, Thomas L. '97	5 00	
Mebane, Robert S. '95–'96–'97	15 00	
Meissner, F. W., Jr. '98	5 00	
Mennen, Gerhard '97	5 00	
Merrell Charles G. '98	5 00	
Merrell, George '98	5 00	
Metz, Abraham L. '94–'95–'96–'97	20 00	
Meyer, Martin M. '97–'98	10 00	
Michaelis, Gustavus. '97–'98	10 00	
Miller, Charles '97	5 00	
Miller, Emerson R. '97	5 00	
Miller, Herman, '97	5 00	
Miller, Jacob A. '97–'98	10 00	
Miller. Jason A. '98	5 00	
Miller, T. Ashby '98	5 00	
Milligan, Decatur '98	5 00	
Mittelbach, William '98	5 00	
Mix, Willis L. '98	5 00	
Mohr, Charles '97–'98	10 00	
Moody, Richard H. '94–'95	10 00	
Moore, Charles G. '96–'97	10 00	
Moore, John T. '98	5 00	
Moore, Josh. F. '95	5 00	
Moore, Silas H. '97	5 00	
Morgan, Aylmer L. '98	5 00	
Morison, J. Louis D. '98	5 00	
Morse, Edward W. '97	5 00	
Morse, Edwin T. '97	5 00	
Morton, John W. '97	5 00	
Mosher, William W. '97	5 00	
Mowry, Albert D. '97	5 00	
Mueller, Adolph '98	5 00	
Mueller, Ambrose '97	5 00	
Mueller, Otto E. '97	5 00	
Muir, Ebenezer '97	5 00	
Mulcahy, Daniel D. '97	5 00	
Mulford, Henry K. '98	5 00	
Mumma, D. Edgar '97–'98	10 00	
Murphy, John S. '97	5 00	
Murray, Benj. L. '97	5 00	
Murray, Emmett L. '97	5 00	
Myers, Daniel '98	5 00	
Myers, Preston B. '97	5 00	
Myers, William H. '97	5 00	
Nattans, Arthur '97	5 00	
Neathery, James M. '96–'97	10 00	
Neppach, Stephen A. '94–'95	10 00	
Newman, George A. '97	5 00	
Newton, Philo W. '97	5 00	
Nichols, Thomas B. '96–'97	10 00	
Nickey, Frank B. '97	5 00	
Nielson, John '97–'98	10 00	
Nipgen, John A. '98	5 00	
Noer, Olaf '97	5 00	
Nowers, Lawrence E, '97	5 00	
Amount carried forward	$3595 00	$60 00

	Annual Dues.	Certificates.
Amount brought forward......	$3595 00	$60 00
O'Gorman, Theophilus V ....'97	5 00	
O'Neil, Henry M ....'97-'98	10 00	
Oberdeener, Samuel ....'97	5 00	
Oldberg, Oscar ....'96-'97	10 00	
Oleson, Olaf M ....'97-'98	10 00	
Oliver, William M...........'98	5 00	
Osgood, Hugh H............'98	5 00	
Osmun, Charles A...........'97	5 00	
Osseward, Cornelius......'97-'98	10 00	7 50
Ottinger, James J ....'98	5 00	
Overstreet, William P....'96-'97	10 00	
Parisen, Allen C.............'98	5 00	
Parisen, George W ....'97	5 00	
Parker, Arthur S ....'95	5 00	
Parkhill, Stanley E ....'95	5 00	
Parks, William N............'97	5 00	7 50
Parsons, John...............'98	5 00	
Partridge, Charles K ....'97	5 00	
Partridge, Frank R.. ....'97	5 00	
Patterson, Theodore H.......'97	5 00	
Pattison, George H..........'97	5 00	
Patton, John F ....'98	5 00	
Pauley, Frank C.............'97	5 00	
Payne, George F.............'98	5 00	
Peacock, Josiah C ....'97	5 00	
Pearce, Howard A...........'98	5 00	
Pearson, Joseph F...........'97	5 00	
Pease, Francis M............'98	5 00	
Peck, Frank H..............'97	5 00	
Peck, George L..........'97-'98	10 00	
Perkins, Benjamin A ....'98	5 00	
Perkins, C. William..........'97	5 00	
Perry, Frederick W. R.......'96	5 00	
Peter, Minor C..............'97	5 00	
Peters, John M..............'97	5 00	
Peterson, J. Otto ....'96-'97	10 00	
Peyton, Robert D............'97	5 00	
Pfiffner, Fritz J. R.......'96-'97	10 00	
Phillips, Carrie E............'97	5 00	
Phillips, Charles W..........'97	5 00	
Phillips, Edwin F............'97	5 00	
Pickett, John H ....'97-'98	10 00	
Pieck, Edward L ....'97	5 00	
Pierce, William H........'97-'98	10 00	
Pile, Gustavus...............'98	5 00	
Pine, Warren C..............'97	5 00	7 50
Pitt, John R ....'98	5 00	
Plaut, Albert.................'98	5 00	
Plenge, Henry ....'97	5 00	
Plummer, Edward ....'97	5 00	
Porter, Chilten S.........'96-'97	10 00	
Porter, Henry C ....'98	5 00	
Porter, Millett N .... '97	5 00	
Portmann, Caesar A. ....'97	5 00	
Power, John J ....'97	5 00	
Priessler, Henry W..........'97	5 00	
Prescott, Horace A....... ...'97	5 00	
Preston, Andrew P. ..... '97-'98	10 00	
Preston, David ....'97-'98	10 00	
Price, Charles H ....'98	5 00	
Price, Joseph................'98	5 00	
Prieson, Adolph ....'98	5 00	
Priest, Carlton R.............'97	5 00	
Puckner, William A. ....'97	5 00	
Quackinbush, Benjamin F....'98	5 00	
Quayle, Thomas A ....'97	5 00	
Rains, A. Brown ....'96-'97'-98	15 00	
Ramaley, Francis........'97-'98	10 00	
Rand, Daniel M ....'97-'98	10 00	
Randall, Frank O. ....'97	5 00	
Ranson, Edward A .... '97	5 00	
Rapelye, Charles A..........'97	5 00	
Rauch, Henry ....'97-'98	10 00	
Ray, Peter W. ....'97	5 00	
Redsecker, Jacob H. ....'97	5 00	
Amount carried forward	$4060 00	$82 50

	Annual Dues.	Certificates.
Amount brought forward	$4060 00	$82 50
Reidy, Michael..............'97	5 00	
Reynolds, Charles E. ....'97	5 00	
Reynolds, Howard P.........'98	5 00	
Reynolds, John J......... ...'97	5 00	
Reynolds, William K... ....'97	5 00	
Rhode, Rudolph E............'98	5 00	
Rhodes, Chas. O. ....'97-'98	10 00	
Rice, Charles ....'98	5 00	
Rich, Willis S.........'95-'96-'97	15 00	
Richardson, Horatio S. ......'98	5 00	
Richardson. Samuel W...... '97	5 00	
Richardson, Thomas L.......'97	5 00	
Riddell, Benjamin F. ....'98	5 00	
Roberts, Thomas............'97	5 00	
Roberts, William ....'97-'98	10 00	
Robertson, Felix O.......'97-'98	10 00	
Robins, Wilbur F........... '97	5 00	
Robinson, Edward A.........'98	5 00	
Robinson, Ernest F.. ....'97	5 00	
Robinson, William A. ....'96-'97	10 00	
Rockefeller, Lucius..........'98	5 00	
Rogers, Arthur H. ....'97	5 00	
Rogers, Edward ....'97	5 00	
Rogers, Henry H............'97	5 00	
Rogers, William H.......'97-'98	10 00	
Rohde, Claus F..............'97	5 00	
Rosenthal, David A. ....'97	5 00	
Ruddiman, Edsel A. ....'97	5 00	
Ruenzel, Henry G...........'98	5 00	
Rumsey, S. L. '93-'94-'95-'96-'97	25 00	
Runyon, Edward W. ....'97	5 00	
Ruppert, John ....'97	5 00	
Rusby, Henry H............'97	5 00	
Ryan, Frank G...............'98	5 00	
Sadtler, Samuel P........'97-'98	10 00	
Sauerhering. Rudolph A......'98	5 00	
Sawyer, Charles H...........'98	5 00	
Sayre, Edward A............'97	5 00	
Sayre, Lucius E. ....'98	5 00	
Sayre, William H............'97	5 00	
Schafer, George H. ....'97	5 00	
Schafhirt, Adolph J..........'97	5 00	
Scheffer, Emil ....'97	5 00	
Scheffer, Henry W. ......'97-'98	10 00	
Scherer, Andrew. ....'97-'98	10 00	
Scherff, John P..............'98	5 00	
Scherling, Gustav . ...'97	5 00	
Schieffelin, William J ....'98	5 00	
Schiemann, Edward B. ......'97	5 00	
Schimpf, Henry W ....'97	5 00	
Schlaepfer, Henry J.........'98	5 00	
Schley, Steiner ....'97	5 00	
Schlotterbeck, Augustus G.'97-'98	10 00	
Schlotterbeck, Julius O. ..'97-'98	10 00	
Schmid, Henry..............'97	5 00	
Schmidt, Florian C....... ...'98	5 00	
Schmidt, Frederick M. ......'98	5 00	
Schmidt, Joseph H ....'97	5 00	
Schmidt, Valentine ....'97	5 00	
Schmitt, George J. F.........'98	5 00	
Schmitter, Jonathan ....'97	5 00	
Schoenhut, Christie H. ......'98	5 00	
Schoettlin, Albert J. ....'97	5 00	
Scholtz, Edmund L.......... '97	5 00	
Schrank, C. Henry ....'98	5 00	
Schroeder, John H.......... '97	5 00	
Schueller, Ernst ....'98	5 00	
Schueller, Frederick W...... '98	5 00	
Schuh, Paul G...............'98	5 00	
Schulze, Louis ....'98	5 00	
Schurk, Louis ....'97	5 00	
Schweickhardt, Richard . ....'95	5 00	
Scott, George T......'95-'96'-'97	15 00	
Scott, J. McDonald..........'96	5 00	
Scott, William H............'98	5 00	
Amount carried forward	$4525 00	$82 50

	Annual Dues.	Certificates.
Amount brought forward	$4525 00	$82 50
Scoville, Wilbur L. '98	5 00	
Searby, William M. '97	5 00	
Sellers, Walter S. '97	5 00	
Selzer, Eugene R. '98	5 00	
Sempill, Walter M. '97	5 00	
Sennewald, Ferdinand W. '97	5 00	
Serodino, Herman '98	5 00	
Sevin, N. Douglas '96-'97	10 00	
Shafer, Erwin C. '98	5 00	
Shannon, Thomas R. '97	5 00	
Sharples, Stephen P. '98	5 00	
Shaw, Robert J. '97	5 00	
Sherman, Charles R. '98	5 00	
Sherwin, Eugene A. '98	5 00	
Sherwood, Henry J. '98	5 00	
Shimer, Miles H. '97-'98	10 00	
Shoemaker, Richard M. '98	5 00	
Shryer, Thomas W. '97	5 00	
Shurtleff, Israel H. '97	5 00	
Siegemund, Charles A. '97	5 00	
Siegenthaler, Harvey N. '97-'98	10 00	
Simmons, Frank B. '97	5 00	
Simon, William '98	5 00	
Simpson, William '97	5 00	
Simpson, William C. '97	5 00	
Simson, Francis C. '97-'98	10 00	
Skelly, James J. '98	5 00	
Slater, Frank H. '97	5 00	
Slaughter, Philip M. '97	5 00	
Smink, Wm. H. R. '95-'96'-'97	15 00	
Smith, B. Frank '97	5 00	
Smith, Charles B. '97	5 00	
Smith, Clarence P. '97	5 00	
Smith, Edward N. '97	5 00	
Smith, Edward S. '97	5 00	
Smith, James P. '95-'96	10 00	
Smith, Lauriston S. '98	5 00	
Smith, Reuben R. '96-'97-'98	15 00	
Smith, Whitefoord G. '96-'97	10 00	
Smithson, David E. '97	5 00	
Sniteman, Chas. C. '96-'97	10 00	
Snyder, Robert J. '97	5 00	
Sohrbeck, G. Henry '97	5 00	
Sohrbeck, George W. '97	5 00	
Solomons, Isaiah A. '98	5 00	
Sords, Thomas V. '97	5 00	
Spalding, Warren A. '98	5 00	
Sparks, James M. '97	5 00	
Spaulding, George S. '97	5 00	
Sperry, Herman J. '98	5 00	
Sprague, Wesson G. '98	5 00	
Squibb, Edward H. '98	5 00	
St. Cyr, Nelvil '97	5 00	7 50
St. John, Sydney S. '97-'98	10 00	
Staebler, Richard '97	5 00	
Stahler, William '97-'98	10 00	
Stam, Colin F. '95	5 00	
Stamford, William H. '97	5 00	
Stamm, Dante M. '97	5 00	
Stange, Carl F. '97	5 00	
Staudt, Louis C. '97	5 00	
Stearns, Frederick '97	5 00	
Stearns, Henry A. '97	5 00	
Stecher, Henry W. '97-'98	10 00	
Stedem. Frederick W. E. '98	5 00	
Steele, George R. '98	5 00	
Steinhauer, Frederick '97	5 00	
Stoughton, Dwight G. '97	5 00	
Stowell, Daniel '97	5 00	
Stratte, Halvor A. '97	5 00	
Sullivan, John W. '97	5 00	7 50
Sweet, Caldwell '98	5 00	
Taylor, George E. '97-'98	10 00	
Temple, Oscar F. '97	5 00	
Thames, Joseph J. '97	5 00	
Amount carried forward	$4975 00	$97 50

	Annual Dues.	Certificates.
Amount brought forward	$4975 00	$97 50
Thieman, John H., Jr. '97	5 00	
Thomas, Oscar E. '96-'97	10 00	
Thomas, Robert, Jr. '97	5 00	
Thomason, Richard J. '97	5 00	7 50
Thomasson, Anders '98	5 00	
Thompson, John '97	5 00	
Thompson, William S. '97	5 00	
Thomsen, John J. '98	5 00	
Thorn, Henry P. '98	5 00	
Thurston, Azor '97	5 00	
Tigner, James O. '97	5 00	
Tilden, Amos K. '97	5 00	
Todd, Albert M. '97	5 00	
Topley, James '98	5 00	
Torbert, Willard H. '98	5 00	
Tracy, David W. '97	5 00	
Trautmann, Ludwig '97	5 00	
Treat, Joseph A. '98	5 00	
Treherne, John C. '97	5 00	
Trevitt, Cleophas A. '97	5 00	
Trimble, Henry '98	5 00	
Troxler, Constantine, Jr. '97	5 00	
Tsheppe, Adolph '97	5 00	
Tucker, Greenleaf R. '96-'97	10 00	
Turner, George H. '96	5 00	
Turrell, Judson W. '97	5 00	
Uhlich, Ferdinand G. '97	5 00	
Ulm, Albert G. '97	5 00	
Urban, Jacob P. '97	5 00	
Van Winkle, Abraham W. '97	5 00	
Vargas-Heredia, Jorge '97	5 00	
Varney, Edward F. '97	5 00	
Vaughan, Parry W. '96	5 00	
Viallon, Paul L. '95	5 00	
Vilter, Hermann T. '97-'98	10 00	
Vockroth, Emil '97	5 00	
Voight, Joseph F. '98	5 00	
Vonachen, Frank H. '97	5 00	
Vordick, August H. '97	5 00	
Voss, George W. '98	5 00	
Votteler William '97	5 00	
Walbrach, Arthur '97	5 00	
Walerius, Mathias '97	5 00	
Walker, John P. '98	5 00	
Walker, William J. '98	5 00	
Wall, Otto A. '97	5 00	
Walts, David Y. '97	5 00	
Wanous, Josie '97	5 00	
Ward, A. Jae '97	5 00	
Ward, Charles A. '97	5 00	
Ward, George J. '97	5 00	
Warn, William E. '98	5 00	
Warren, William M. '98	5 00	
Washburn, Harry M. '96	5 00	
Watson, Herbert K. '97	5 00	
Watt, George H. '97	5 00	
Watters, Henry '97	5 00	
Waugh, George J. '97-'98	10 00	
Wearn, William H. '94-'95	10 00	
Webb, William H. '98	5 00	
Webster, H. Gordon '96-'97	10 00	
Weeks, B. Frank '95	5 00	
Wehrly, Thomas M. '97	5 00	
Weidemann, Chas. A. '98	5 00	
Wells, Charles H. '97	5 00	
Wendell, Henry E. '98	5 00	
Wenzell, William T. '98	5 00	
Werner, Rudolf C. '97-'98	10 00	
Wescott, William C. '97	5 00	
West, Charles A. '97-'98	10 00	
Westcott, James W. '95-'96-'97	15 00	
Wetterstroem, Albert '97	5 00	
Wetterstroem Theodore D. '97	5 00	
Wheeler, William D. '98	5 00	
Whelpley, Henry M. '97	5 00	
Amount carried forward	$5400 00	$105 00

	Annual Dues.	Certificates.
Amount brought forward......	$5400 00	$105 00
Whitcomb, Frederick E......'97	5 00	
White, George H............'95	5 00	
White, Herbert E ....'97	5 00	
White, Richard E............'97	5 00	
Whitman, Nelson S..........'97	5 00	
Whitney, Edgar F. ......'97-'98	10 00	
Wichelns, Frederick ....'98	5 00	
Wickham, William H ....'97-'98	10 00	
Wilbur, Lot.................'98	5 00	
Williams, George G..........'97	5 00	
Williams, John K............'97	5 00	
Williams, Richard W.........'98	5 00	
Williams, Seward W ....'97	5 00	
Williams, William H.........'97	5 00	
Willis, Henry...............'97	5 00	
Wilson, Frank M............'98	5 00	
Wilson, John M.............'97	5 00	
Wilson, William.............'97	5 00	
Winnberg, John M ....'97	5 00	
Wittich, Matthew H ....'97	5 00	$ 5 00
Wittmer, Joseph W., Jr......'98	5 00	
Amount carried forward.	$5515 00	$110 00

	Annual Dues.	Certificates.
Amount brought forward......	$5515 00	$110 00
Wood, Alonzo F., Jr ....'98	5 00	
Wood, Edward S ....'98	5 00	
Wood, James P..............'98	5 00	
Wood, John W..............'97	5 00	
Woodman, Walter I. ....'98	5 00	
Woodruff, Roderick S........'97	5 00	
Woods, Chas. H. A..........'97	5 00	
Woodward, Brinton W.......'97	5 00	
Wooldridge, Daniel T........'98	5 00	
Wulling, Frederick J ....'97	5 00	
Wunderlich, Edward. ....'97	5 00	
Wyckoff, Elmer E. ....'97	5 00	
Yearby, William M.......'95-'96	10 00	
Youngs, William ....'95-'96	10 00	
Ziegler, Philip M ....'98	5 00	
Zimmermann, Albert ....'98	5 00	
Zimmermann, Bernard ....'98	5 00	
Zoeller, Edward V...........'98	5 00	
Zuenkeler, J. Ferd...........'98	5 00	
Zwick, George A.........'97-'98	10 00	
Totals	$5630 00	$110 00

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE FORTY-SIXTH ANNUAL MEETING, HELD AT BALTIMORE, MD., WITH THE NAMES OF THEIR PRESIDENTS AND SECRETARIES.

Name	*President.*	*Secretary.*
Albany	Joseph W. Russell	De Baun Van Aken.
Atlanta	N. J. Hammond	W. S. Kendrick.
Chicago.	A. S. Draper	W. B. Day.
Cincinnati	A. Wetterstroem	M. Dodsworth.
Cleveland	E. A. Schellentrager	Jos. Feil.
Louisville	Philip Heuser	G. L. Curry.
Maryland	Charles E. Dohme	H. P. Hynson.
Massachusetts	Linus D. Drury	W. D. Wheeler.
Montreal	W. H. Chapman	E. Muir.
National	S. L. Hilton	W. H. Bradbury.
New York	Edw. Kemp	Thos. F. Main.
Ontario	Henry Watters	Isaac I. Lewis.
Philadelphia	Chas. Bullock	Wm. B. Thompson.
Pittsburgh	Louis Emanuel	A. N. Poth.
St. Louis	H. F. A. Spilker	J. C. Falk.

SCHOOLS OF PHARMACY.

University of Minnesota .... F. J. Wulling, *Dean.*

STATE PHARMACEUTICAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Connecticut	Jno. W. Lowe	A. S. Clark.
Delaware	Jno. M. Harvey	F. W. Fenn.
District of Columbia	Robt. N. Harper	W. H. Bradbury.
Illinois	Theo. C. Loehr	Frank Fleury.
Iowa	W. G. Bale	A. H. Miles.
Kentucky	O. C. Dilly	J. W. Gayle.
Maine	W. A. Robinson	M. L. Porter.
Maryland	Robt. S. McKinney	Chas. H. Ware.
Massachusetts	Jas. J. Curran	J. F. Guerin.
Michigan	A. H. Webber	C. F. Mann.
Minnesota	C. T. Heller	H. Rauch.
Missouri	T. N. Moseley	H. M. Whelpley.
Nebraska	F. G. Fricke	B. C. Heilman.
New Jersey	Wm. T. Brown	F. C. Stutzlen.
New York	Wm. Muir	J. B. Todd.

Name.	*President.*	*Secretary.*
North Carolina	W. M. Yearby	H. R. Horne.
North Dakota	T. W. Kibbel	W. L. Parker.
Ohio	J. H. Beal	L. C. Hopp.
Pennsylvania	M. N. Kline	J. A. Miller.
Province of Quebec	R. W. Williams	E. Muir.
Rhode Island	M. B. Wood	W. E. Cates.
South Carolina	O. E. Thomas	J. A. Barbot.
South Dakota	C. H. Lohr	E. C. Bent.
Texas	Ed. Dreiss	R. H. Walker.
Vermont	W. E. Terrill	H. A. Chapin.
Virginia	C. G. Maphis	C. B. Fleet.
Wisconsin	Chas. Pfeifer	E. B. Heimstreet.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	President.	*Secretary.*
Philadelphia	J. C. Perry	W. E. Krewson.
St. Louis	L. A. Seitz	O. F. Claus.

NATIONAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Proprietary	Thos. Doliber	Jos. Leeming.
Wholesale Druggists	C. F. Weller	A. B. Merriam.

LOCAL ASSOCIATIONS.

Name.	*President.*	*Secretary.*
Kings Co. Pharm, Assoc.	Adrian Paradis	F. N. Bliss.
Norfolk and Portsmouth, Va., Pharm. Assoc.	W. S. Langhorne	J. W. Thomas, Jr.
St. Louis Drug Clerks' Society	M. J. Noll	E. Trittermann.
German Apothec. Soc. of City of N. Y.	C. F. Schleussner	S. Faber.

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT BALTIMORE.

Names of delegates indicated by *; delegates not members, by *†.

Alpers, W. C., New York, N. Y.
*Arny, H. V., Cleveland, O.
*†Aschman, F. F., Pittsburg, Pa.
Averill, W. H., Frankfort, Ky.
*†Baker, Geo. R., Chicago, Ill.
Baker, J. Roberts, Richmond, Va.
Banner, Jno., Mt. Airy, N. C.
Bartells, G. C., Camp Point, Ill.
*Bartley, E. H., Brooklyn, N. Y.
*Base, Daniel, Baltimore, Md.
Beal, J. H., Scio. O.
Birdsong, E. G., Raleigh, N. C.
*Bobbitt, J. H., Raleigh. N. C.
Boeddiker, Otto, New York, N. Y.
*Boring, E. M., Philadelphia, Pa.
*Boynton, H., Biddeford, Me.
Brack, Chas. E., Baltimore, Md.
Brickman, A. O., Baltimore, Md.
Brown, Wm. T., Madison, N. J.
*Burgess, Wm. G., Newport News, Va.
*Burgheim, J., Houston, Tex.
*Burns, E. M., Mason City, Ia.
Burrough, H., Baltimore, Md.
*Butler, F. H., Lowell, Mass.
Byrne, Jno., Columbus, O.
Cameron, D. L., Rutherford, N. J.
Candidus, P. C., Mobile, Ala.
Carpenter, A. B., Greenville, S. C.
Case, C. H., Jefferson, O.
Caspari, Chas., Jr., Baltimore, Md.
Caspari, Wm., Jr., Baltimore, Md.
Church, M. E., Falls Church, Va.
*Cliffe, W. L., Philadelphia, Pa.
*Coblentz. V., New York, N. Y.
Cook, T. P., New York, N. Y.
*Corning, A. J., Baltimore, Md.
Culbreth, D. M. R., Baltimore, Md.
Davis, Jno. A., Baltimore, Md.
Dewoody, W. L., Pine Bluff, Ark.
*Diehl, C. L., Louisville, Ky.
*Diekman, G. C., New York, N. Y.
*†Diller, R. W., Springfield. Ill.
Dohme, A. R. L., Baltimore, Md.
Dohme. Chas. E., Baltimore, Md.
*Dohme, Louis, Baltimore, Md.
Drury, L. D., Boston, Mass.
Duble, J. B., Williamsport, Pa.
*Duckett. W. G., Washington, D. C.
Eccles, R. G.. Brooklyn, N. Y.
Eliel, Leo, South Bend, Ind.
Elliott, H. A., Baltimore, Md.
Ellis, E. T., Philadelphia, Pa.
Erb, Chas. S., New York, N. Y.
*Etzel, Jno. L., Clear Lake, Ia.
Ewing, Mary S., Boston, Mass.
*†Fahlen, Julius, St. Louis, Mo.
*Faulkner, G. E., South Boston, Va.
Feidt, G. D., Philadelphia, Pa.
*Feil, Jos., Cleveland, O.
Firmin, J. C., Findlay, O.
Foster, J. W., Baltimore, Md.
Fouch, W. M., Baltimore, Md.
*Freericks, F. H., Cincinnati, O.
Gane, E. H., New York, N. Y.
*Gayle, J. W., Frankfort, Ky.
Gilpin, H. B., Baltimore, Md.
*Godding, J. G., Boston, Mass.
Gordon, W. J. M., Cincinnati, O.
*Gregorius, Geo., New York, N. Y.
Guerin, J. F., Worcester, Mass.
Hancock, J. F., Baltimore, Md.
Hancock, J. H., Baltimore, Md.
Hardin, J. H., Wilmington, N. C.
Hargrave, E. F., Suffolk, Va.
Harrison, W. J., Lakewood, N. J.
Hartnett, E., Jersey City, N. J.
*Hassebrock, H. F., St. Louis, Mo.
*Hechler, G. L., Cleveland, O.
Hedley, T. A., Boston, Mass.
*Heinitsh, C. A., Lancaster, Pa.
*Heintzelman, J. A., Philadelphia, Pa.
Helfman, Jos., Detroit, Mich.

Henry, C. L., Washington, D. C.
Hicks, H. T., Raleigh, N. C.
Hoch, A., Philadelphia, Pa.
Holmes, C. W., Elmira, N. Y.
*†Holmes, R. F., Norfolk, Va.
*Holzhauer, Chas., Newark, N. J.
Hopkins, J. L., New York, N. Y.
Hopp, L. C., Cleveland, O.
*Huested, A. B., Albany, N. Y.
Hynson, H. P., Baltimore, Md.
Ingalls, Jno., Macon, Ga.
*†Ingram, W. F., Norfolk, Va.
Ink, C. E., Columbiana, O.
Jacobs, Jos., Atlanta, Ga.
Jenkins, W. E., Baltimore, Md.
Johnson, D. D., Concord, N. C.
Jungmann, J., New York, N. Y.
*Karn, W. A., Woodstock, Ontario, Can.
*Kauffman, G. B., Columbus, O.
Kebler, L. F., Philadelphia, Pa.
Keenan, T. J., New York, N. Y.
Kelly, Jno. I., Baltimore, Md.
Kennedy, G. W., Pottsville, Pa.
*Knox, J. W. T., Detroit, Mich.
Kraemer, Henry, Philadelphia, Pa.
*Kremers, Edw., Madison, Wis.
Krueger, O. W., Kansas City, Mo.
Lampa, R. R., New York, N. Y.
*La Pierre, E. H., Cambridge, Mass.
Larrabee, Jno., Melrose, Mass.
Lemberger, J. L., Lebanon, Pa.
Lindeman, H. F., Baltimore, Md.
*Lindvall, Gus., Moline, Ill.
Lloyd, J. U., Cincinnati, O.
Lowe, C. B., Philadelphia, Pa.
Lowe, J. W., New Haven, Conn.
*Lyons, A. B., Detroit, Mich.
*McIntyre, Wm., Philadelphia, Pa.
McKinney, R. S., Taneytown, Md.
*†MacKenzie, J. H., Toronto, Can.
Macnair, W. H., Tarboro, N. C.
MacRae, J. Y., Raleigh, N. C.
*Main, T. F., New York, N. Y.
Maisch, Henry, Baltimore, Md.
*Mansfield, S., Baltimore, Md.
*Maphis, C. G., Charlottesville, Va.
Matthews, C. E,, Chicago, Ill.
*Mayo, C. A., New York, N. Y.
Meissner, F. W., Jr., La Porte, Ind.
Menk, C. W., Newark, N. J.
Mennen, G., Newark, N. J.
Merrell, C. G., Cincinnati, O.
*Meyer, C. L., Baltimore, Md.
Miller, A. W,, Philadelphia, Pa.
*Miller, T. A., Richmond, Va.
*Mittelbach, W., Boonville, Mo.
Moerk, F. X., Philadelphia, Pa.
Molwitz, E., New York, N. Y.
Morison, J. L. D., Philadelphia, Pa.
*Morrison, J. E., Montreal, Canada.
Morse, E. W., Mt. Vernon, Ill.
Murphy, J. S., Pontiac, Ill.
Muth, Geo. L., Baltimore, Md.
Muth, Jno. C., Baltimore, Md.
Muth, Jno. S., Baltimore, Md.
Nattans, A., Baltimore, Md.
*Newman, Geo. A., Louisville, Ky.
*Noll, M. J., St. Louis, Mo.
Nordmann, H., Baltimore, Md.
Norton, G. E., Cambridge, Mass.
Ogier, J. M., Cambridge, O.
Patton, J. F., York, Pa.
*Payne, Geo. F., Atlanta, Ga.
Pennock, Edw., Baltimore, Md.
Pile, Gus., Philadelphia, Pa.
Plenge, H., Charleston, S. C.
*Powell, Wm. C., Snow Hill, Md.
Quandt, A. A., Baltimore, Md.
Quandt, E. E., Baltimore, Md.
Rains, A. B., Columbia, Tenn.
*Rapelye, C. A., Hartford, Conn.
*Redsecker, J. H., Lebanon, Pa.
*Reed, T. D., Montreal, Can.
*Remington, J. P., Philadelphia, Pa.
Richardson, T. L., Baltimore, Md.
*Root, W. F., Brattleboro, Vt.
Rosenzweig, B., Brooklyn, N. Y.
*Rusby, H. H., New York, N. Y.
*Ryan, F. G., Philadelphia, Pa.
Sander, Enno, St. Louis, Mo.
Sayre, E. A., New York, N. Y.
Sayre, L. E., Lawrence, Kans.
*Schley, S., Frederick, Md.
*Schrader, A. C., Baltimore, Md.
Schulze, L., Baltimore, Md.
*Scoville, W. L., Boston, Mass.
*Selzer, E. R., Cleveland, O.
Sharp, A. P., Baltimore, Md.
*Sheppard, S. A. D., Boston, Mass.
Sherwood, H. J., Cleveland, O.
Shoemaker, R. M., Philadelphia, Pa.
Simms, G. G. C., Washington, D. C.
Simon, Wm., Baltimore, Md.
Simpson, Wm., Raleigh, N. C.

Smith, T., Baltimore, Md.
Sparks, J. M., Fort Smith, Ark.
Sprague, W. G., Flushing, Mich.
Staebler, Rich., Newark, N. J.
Staehle, L. L., Newark, N. J.
*Stedem, F. W. E., Philadelphia, Pa.
*Stevens, A. B., Ann Arbor, Mich.
Stewart, F. E., New York, N. Y.
Takamine, Jokichi, New York, N. Y.
Taylor, M. H., Macon, Ga.
Thomas, J. B., Baltimore, Md.
*†Thomas, J. W., Jr., Norfolk, Va.
Thompson, A. E., Baltimore, Md.
*Thompson, Wm. S., Washington, D. C.
*Voss, G. W., Cleveland, O.
*Wanous, Josie A., Minneapolis, Minn.
*Ware, Chas. H., Baltimore, Md.
Watson, H. K., Wilmington, Del.
Watson, S. P., Atlanta, Ga.
*Werner, R. C., Brooklyn, N. Y.
Wescott, W. C., Atlantic City, N. J.
*Westcott, J. W., Baltimore, Md.
*Whelpley, H. M., St. Louis, Mo.
White, G. H., Jersey City, N. J.
*Whitney, H. M., North Andover Depot, Mass.
*Wiegand, T. S., Philadelphia, Pa.
Wikle, J. L., Anniston, Ga.
Williamson, Lee, Baltimore, Md.
*Willis, Henry, Quebec, Canada.
Winkelmann, Harry C., Baltimore, Md.
Winkelmann, Jno. H., Baltimore, Md.
Wood, Mason B., Providence, R. I.
Zoeller, E. V., Tarboro, N. C.

LIST OF NEW MEMBERS.

Allen, Jno. H., St. Louis, Mo.
Alpers, W. H,, Bayonne, N. J.
Aughinbaugh, D. C., Hagerstown, Md.
Banner, Jno., Mt. Airy, N. C.
Base, Daniel, Baltimore, Md.
Bingham, W. E., Tuscaloosa, Ala.
Birdsong, Ed. G., Raleigh, N. C.
Brickman, A. O., Baltimore, Md.
Brigham, W. S., Montgomery, Ala.
Broe, James A., Portland, Me.
Burgess, W. G., Newport News, Va.
Carpenter, A. B., Greenville, S. C.
Caspari, Wm., Jr., Baltimore, Md.
Cliffe, Wm. L., Philadelphia, Pa.
Cline, R. R. D., Galveston, Tex.
Corning, Albion J., Baltimore, Md.
De Reeves, A. E., Cambridge, Md.
Diekman, Geo. C., New York, N. Y.
Dreiss, James E., San Antonio, Tex.
Douglass, Stephen M., Washington, D. C.
*Dubé, J. Edmond, Quebec, Can.
Erb, Chas. S., New York, N. Y.
Ewell, Ervin E., Washington, D. C.
Ewing, Mary S., Boston, Mass.
Faulkner, G. E., South Boston, Va.
Feidt, Geo. D., Philadelphia, Pa.
Field, Wm. C., Washington, D. C.
Foster, Chas., Cleveland, O.
Fouch, Wm. M., Baltimore, Md.
Frank, H. O., Milwaukee, Wis.
Goldsboro, Chas. H., Danville, Va.
Gregorius, Geo., New York, N. Y.
Guerin, James F., Worcester, Mass.
Hall, R. E. Lee, Baltimore, Md.
Hay, Chas. La Mar, Du Bois, Pa.
Hicks, Henry T., Raleigh, N. C.
Hopkins, J. L., New York, N. Y.
Jenkins, W. E., Baltimore, Md.
Johnson, Mrs. Louise L., Jasper, Minn.
Kammer, D. A., Baltimore, Md.
Karn, W. A., Woodstock, Ont., Can.
Kelly, Jno. I., Baltimore, Md.
Knox, J. W. T., Detroit, Mich.
Krick, Chas. A., Fort Walla Walla, Wash.
Lindeman, Harry F., Baltimore, Md.
Lowe, John W., New Haven, Conn.
McKinney, R. S., Taneytown, Md.
McLarty, Colin, Norfolk, Va.
Macnair, W. H., Tarboro, N. C.
Maisch, Henry, Baltimore, Md.
Mansfield, Samuel, Baltimore, Md.
Maphis, Chas. G., Charlottesville, Va.
May, Chas. C., St. Louis, Mo.
Menk, Chas. W., Newark, N. J.
Miller, W. H., New Philadelphia, Pa.
Moerk, Frank X., Philadelphia, Pa.
Morris, Max, Macon, Ga.
Muth, Jno. C., Baltimore, Md.
Muth, Jno. S., Baltimore, Md.
Noll, M. J., St. Louis, Mo.
Pearman, Wm. E., Philadelphia, Pa.
Pennock, Ed., Baltimore, Md.
Pfeiffer, Jno., San Antonio, Tex.
Pilson, A. O., Baltimore, Md.
Powell, Wm. D., Excello, Macon Co., Mo.
*Power, Jno. J., Quebec, Can.
*Ranson, Edw. A., Lachine, Que., Can.
Robinson, S. Le Roy, Baltimore, Md.
Root, W. F., Brattleboro, Vt.
Rosenzweig, Benj., Brooklyn, N. Y.
Schetky, L. O., Mt. Holly, N. J.
Schrader, Aug. C., Baltimore, Md.
Sheehey, Henry L., Sherman, Tex.
Sprowl, Geo. M., Union City, Ind.
Staehle, Lewis L., Newark, N. J.
Stuart, Wm. A., Baltimore, Md.
Takamine, Jokichi, New York, N. Y.
Taylor, Mallory H., Macon, Ga.
Thomas, Jno. B., Baltimore, Md.
Thompson, A. E., Baltimore, Md.
Walts, Chas. C., Hagerstown, Md.
Ware, Chas. H., Baltimore, Md.
Wiesel, Jno. M., Baltimore, Md.
Wikle, J. L., Armiston, Ala.
Williamson, Lee, Baltimore, Md.
*Willis, Henry, Quebec, Can.
Winkelmann, Harry C., Baltimore Md.
Wuensch, Chas., Newark, N. J.

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* Elected in 1897, but name received too late for publication in last volume of Proceedings.

LIST OF LIFE MEMBERS.

PUBLISHED IN ACCORDANCE WITH RESOLUTIONS OF THE COUNCIL.

SEE PROCEEDINGS 1888, PAGE 41.

[Names of Life Members under the Old Constitution in *Italics;* under the present By-Laws, in SMALL CAPITALS.]

Abernethy, Maxwell.
Bauer, Louis G.
Bayley, Augustus R.
Biroth, Henry.
Blatchford, Eben.
Boring, Edwin M.
Buck, John.
Bullock, Charles.
Calder, Albert L.
Candidus, Philip C.
Canning, Henry.
Coombs, Charles E.
Cummings, Henry T.
Dearborn, George L.
Dohme, Louis.
Doliber, Thomas.
Drake, John R.
Drury, Linus D.
Du Puy, Eugene.
Ebert, Albert E.
Eckford, Joseph W.
Elliott, Henry A.
Ellis, Evan T.
Fougera, Edmund C. H.
Fuller, Oliver F.
Gale, Edwin O.
Gale, William H.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel F.
Grossklaus, John F.
Hance, Edward H.
Harlow, Noah S.
Haviland, Henry.
Heinitsh, Charles A.
Heintzelman, Joseph A.
Heyl, James B.
Holmes, Clay W.
Holzhauer, Charles.
Hudnut, Alexander.
Jacques, George W.
Jenks, Wm. F.
Jesson, Jacob.
Kent, Robert R.
King, James T.
Klussmann, Hermann
Land, Robert H.
Lee, James A.
Leitch, Arthur.
Lemberger, Joseph L.
Lewellyn, John F.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
Meyer, Christian F. G.
Milhau, Edward L.
Miller, Adolphus W.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
Moore, George.
Moore, Joachim B.
Newman, George A.
Ollif, James H.
Orne, Joel S.
Owens, Richard J.
Patten, I. Bartlett.
Peabody, Wm. H.
Perot, T. Morris.
Petitt, Henry M.
Pfingst, Ferdinand J
Plummer, David G.
Rano, Charles O.
Ramsperger, Gustavus.
Remington, Joseph P.
Rittenhouse, Henry N.

Robinson, James S.
Rollins, John F.
Russell, Eugene F.
Sander, Enno.
Saunders, William.
Seabury, George J.
Sharp, Alpheus P.
Sheppard, Samuel A. D.
Shinn, James T.
Simms, Giles G. C.
Sloan, George W.
Snyder, Ambrose G.
Squibb, Edward R.
Stacey, Benjamin F.
Steele, James G.
Sweeney, Robert O.
Thompson, William B.
Tufts, Charles A.
Vernor, James.
Wardell, Robert C.
Warner, William R.
Waugh, George J.
Wellcome, Henry S.
Whitfield, Thomas.
Whitney, Henry M.
Wiegand, Thomas S.
Wilson, Benjamin O.
Winkelmann, John H.
Winter, Jonas.
Woltersdorf, Louis.
Yorkston, Matthew M.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

Sections Applicable to the American Pharmaceutical Association.

Class 3, Societies, Benevolent, Educational, etc.

Sec. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and object of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

Sec. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same. and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

Sec. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business; and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

Sec. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed; and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

Sec. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows: whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that purpose, the proceedings of which meeting shall be duly entered in the records of the corporation; said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States, relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, we, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said Association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth. The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed: John U. Lloyd, Maurice W. Alexander,
Alex. K. Finlay, Karl Simmon,
Samuel A. D. Sheppard, John M. Maisch,
James Vernor, C. Lewis Diehl,
William H. Rogers, Wm. Saunders,
Albert E. Ebert, Philip C. Candidus,
George W. Kennedy, Albert H. Hollister,
James M. Good, Lewis C. Hopp,
William Dupont.,

Members of the Council,

And John A. Milburn, G. G. C. Simms,
E. B. Bury, Z. W. Cromwell,
W. S. Thompson, John R. Major,
Charles Christiani, W. G. Duckett,
A. J. Schafhirt, Geo. W. Boyd,
O. H. Coumbe, Henry A. Johnston,
Geo. B. Lockhart, W. C. Milburn,
T. C. Murray, Arthur Nattans,
Joseph R. Walton, Thomas M. Wehrly,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: James M. Trotter, *Recorder.*

Seal:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulterations.

2. To encourage such proper relations among Druggists, Pharmacists, Physicians, and the people at large, as may promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a General Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom shall be elected annually; also a Local Secretary to be elected by the Council. They shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting, when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice-Presidents.

ARTICLE I. The President shall preside at all general sessions of the Association, except those of the special Sections, as hereinafter provided. In the event of his absence or inability to serve, one of the Vice-Presidents, or in the absence of all a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. At the sessions the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all balloting, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal; and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality and impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in case where he prefers to submit the matter to the members; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-Laws are properly enforced.

ARTICLE VII. He shall appoint all committees, not provided for in the By-Laws or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the General Secretary.

ARTICLE I. The General Secretary shall be elected annually and shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the general sessions, and carefully preserve, on file, all reports, essays, and papers of every description presented to the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Report of the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every standing and special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act. He shall notify every member at least two weeks in advance of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the General Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists, may be held each year, should the Council so determine, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the General Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual dues for three years.

Article IV. He shall present a statement of his accounts at each annual meeting of the Council, that they may be audited; he shall receive an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

Article V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $5,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or a Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

Article I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual salary of $750.

Article II. All journals and volumes received in exchange for the Proceedings by the General Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the General Secretary for preservation.

Article III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry and Materia Medica, and the collateral branches of knowledge; together with such statistical and biographical notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

Article IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting, unless such meeting is held previous to August 1. An introduction or synopsis of the Report to be presented to the Section on Scientific Papers.

Article V. In case of the illness or other inability of the Reporter to carry on the work of the report, the General Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

Article I. The business of the Association which is not of a scientific character shall be in charge of a Council, which is empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by vote of the Council, be permitted to speak on any subject under discussion.

Article II. The Council shall consist of twenty-one members, nine of whom, selected from such members as have had at least three years' membership in this Association, shall be elected by ballot by the Association in the following order: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years. None but *ex-officio* members of the Council shall be eligible for re-election thereto until one year after the expiration of their term of office.

ARTICLE III. The President, Vice-Presidents, General Secretary, Local Secretary, Treasurer, Reporter on the Progress of Pharmacy, the Chairmen of the Sections of the Association, and the Secretary of the Council, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and a Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual Report of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sessions of the Association and of the Sections, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as it may deem worthy of insertion. It shall also fix the price at which the Proceedings may be sold.

CHAPTER VII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, subscribe to them, are eligible to membership; provided that no one, whose name has been dropped from the roll for non-payment of dues, shall be eligible for membership until payment has been made of the three years' dues for which he is in arrears.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and post the name in some suitable place in the meeting hall, near the beginning of a session: objection, if any, to be made in writing, to the Secretary of the Council, previous to the Association taking any action on the proposition. Near the close of the same, or at a subsequent session, the Association may, by vote, elect such person a member, after which his membership shall be completed by his signing the Constitution and By-Laws, and paying the annual dues for the current year.

ARTICLE III. Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and by neglecting to pay said contribution for *three successive years* he may be dropped from the Roll.

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, also any member who shall have paid to the Treasurer annual dues for thirty-seven years, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials shall be sent to the General Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, the General Secretary, and the Treasurer.

ARTICLE VII. Resignations of membership shall be made in writing to the General Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE VIII. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at a general session.

ARTICLE IX. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER VIII.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows: 1. Section on Scientific Papers; 2. Section on Commercial Interests; 3. Section on Pharmaceutical Legislation and Education.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read the minutes of Council, act on the report of Council on membership, and receive propositions for amendments to the By-Laws.

ARTICLE V. At the third session the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fourth, fifth and sixth sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. At the seventh, eighth and ninth sessions the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

ARTICLE VIII. A Chairman and a Secretary shall be elected by ballot by each Section to serve at the sessions of said Section. The minutes of each session, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the General Secretary for publication and safe-keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its sessions, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the General Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the General Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. Reports of Committees shall be presented, read by their titles, synopsis or in full, and laid on the table for future consideration.

Section 6. The President shall call the roll of States, the Territories, District of Columbia and the Provinces of Canada, requesting the members present from each State or Territory to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing three years; in addition to which the President shall appoint five members from the Association at large to act with the Committee. Delegates who are not members must complete their membership before they are eligible to serve on the Nominating Committee.

Section 7. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, its acts shall be revised, so as to be acceptable to the Association.

Section 8. A committee of five on time and place of meeting shall be appointed by the President at the first session, to report at the second session.

Section 9. Incidental business.

ARTICLE XII. The order of business at the second general session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the persons nominated shall be balloted for.

Section 4. The Council shall present names of persons recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

Section 7. Incidental business.

ARTICLE XIII. The order of business for the sessions of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last general session of the Association the newly-elected officers of the Association shall take their respective places.

ARTICLE XVI. The Council may arrange for such social sessions, to be held after the adjournment of the last general session, as it may deem expedient, but no business of the Association can be transacted at these social sessions.

CHAPTER IX.

Of Committees.

ARTICLE I. There shall be appointed or elected seven Standing Committees as follows: a Committee on Commercial Interests, a Committee on the Revision of the Pharmacopœia, and a Committee on Pharmaceutical Legislation and Education, each to consist of five members; a Committee on Scientific Papers, a Committee on the Ebert Prize, a Committee on General Prizes, each to consist of three members; and a Committee on Transportation, to consist of ten members.

ARTICLE II. The Committee on Commercial Interests shall be elected by the Section on Commercial Interests. It shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. It shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be elected by the Section on Scientific Papers. It shall arrange the business of the Section, and shall report a number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person preparing a paper for the Association which will require more than ten minutes for its reading, must accompany the same with a synopsis which can be read within ten minutes' time. The paper and synopsis must both be furnished the Committee of the particular Section to which it refers, previous to the first session.

ARTICLE V. The Committee on the Ebert Prize, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all respects it shall be governed by the stipulations expressed by the donor.

ARTICLE VI. The Committee on General Prizes, which shall be appointed by the President, shall, at the next annual meeting after the one at which the papers are presented, determine which, if any of them, are worthy of prizes, and decide upon the relative merits of such papers as are deemed worthy.

ARTICLE VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. It shall report at each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. It shall arrange the business of the Section in advance of its sessions, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to it by the Section. It shall propose each year a subject for discussion at the meetings of the State Associations, and, at the following annual meeting of this Association, shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE VIII. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which official and non-official remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and requirements of the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia. It shall also note errors of any kind found in the U. S. Pharmacopœia, so as to facilitate and aid the work of the National Committee on Revision of the U. S. P.

Article IX. The Committee on Transportation, which shall be elected by the Council, shall consist of one member each from the cities of Boston, New York, Chicago, St. Louis, Cincinnati, New Orleans, Atlanta, St. Paul or Minneapolis, Denver and San Francisco, and in conjunction with the General Secretary and the Local Secretary, who shall be members of the Committee, shall arrange for transportation from the different sections of the United States and Canada to the place of meeting and return. The Council shall annually elect the Chairman of this Committee.

CHAPTER X.

Rules of Order and Debate.

Article I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

Article II. When a question is regularly before the assembly and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order named. A motion to adjourn shall be decided without debate.

Article III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

Article IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

Article I. On all points of order not covered in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

Article II. Every proposition to alter or amend these By-Laws shall be submitted in writing at a general session, and may be balloted for at any subsequent general session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

Article III. No one or more of these By-Laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, a Vice-Chairman and a Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the Chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $150.

ARTICLE II. He shall post in a conspicuous place in the meeting-room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose; shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting of the Council.

CHAPTER IV.

Of Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of seven members of the Council, to be elected annually by ballot. The General Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect its chairman immediately after the election of its members by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present to the Council the list of applicants for membership who have complied with the requirements of the By-Laws of the Association.

ARTICLE III. It shall furnish appropriate biographical sketches of deceased members for publication in the Report of the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

Of Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council. Immediately after its election by the Council, the Committee shall elect a Chairman.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Report of the Proceedings.

CHAPTER VI.

Of Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members, who shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the General Secretary. It shall receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount and cost of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. The Committee shall consider these applications, and at as early a date as possible shall report to the Council an outline of the proposed investigations, together with such recommendations of grants from the available funds as it may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and in case the grants be approved, the Chairman of the Council shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

Of Sessions.

ARTICLE I. The Council shall meet previous to the assembling of the Association, and at such other times as it may determine, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special session shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and the Secretary.
2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of seven members of the Council, the General Secretary and the Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session of the Council shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present. The ayes and nays of such votes taken by the Council shall be entered upon the minutes.

ARTICLE III. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at the next session of the Council, when upon receiving the vote of three-fourths of the members present, it shall become a part of these By-Laws.

SECTION ON COMMERCIAL INTERESTS.

ORDER OF BUSINESS.

1. Calling the Section to Order.
2. Reading of the Chairman's Address.
3. Reports of Committees.
4. Reading of Papers.
5. New Business and Discussion.
6. Nomination and Election of Officers for the ensuing year.
7. Installation of Officers.
8. Reading of the Minutes.
9. Adjournment.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to Order.

2. Reading of the Chairman's Address.

3. Reports of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.

4. Nominations (but not elections at this sitting) for the new officers of the Section. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.

5. Reading of Papers and discussions on the subjects brought up.

6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous Session.
2. Election of Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

SECTION ON EDUCATION AND LEGISLATION.

ORDER OF BUSINESS.

First Session of the Section.

1. Calling the Section to Order.
2. Reading of the Address of the Chairman.
3. Reports of Committees.
4. Nominations of Officers for the ensuing year. The election to take place at the opening of the second session.
5. Reading of Papers and Discussion.
6. Adjournment.

Second Session of the Section.

1. Reading of Minutes of the previous Session.
2. Election of Officers for the ensuing year.
3. Reports of Committees—Incidental Business.
4. Reading of Papers and Discussion.
5. Adjournment.

Third Session of the Section.

1. Reading of Minutes of the previous Session.
2. Reading of Papers and Discussion.
3. Reports of Committees.
4. Installation of Officers.
5. New Business.
6. Reading of Minutes.
7. Final Adjournment.

GENERAL RULES OF FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888, 1895.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed by the Council an Auditing Committee, this Committee to consist of three members residing in or near the same city or town, the Chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report, shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Auditing Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Auditing Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, saving-bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Auditing Committee.

Tenth, There shall be a meeting of the Auditing Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and previous to the 1st day of August following, to make a report thereon, in writing, to the chairman of the Council.

Eleventh, The expense of the bond of the Treasurer, given by a Trust Company, shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

Thirteenth, The Finance Committee shall each year, previous to June 1st, present to the Council for its consideration a list of appropriations to cover the various expenditures of the coming fiscal year, the total of such appropriations to be based on the probable amount to be received from the annual dues for the coming year. No payment shall be made in excess of said appropriation except by special vote of the Council.

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them. I also enclose the annual contribution, five dollars, for the first year of my membership.

Name in full...

Number and Street...

Town and State..

Recommended by the undersigned two members in good standing:

....

....

FORMS OF PROPOSITIONS AND OF COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VII., ARTICLE II., OF THE BY-LAWS.

THE undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VII., Article II. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES OF CANDIDATES.	ADDRESS.

Proposed by...

....

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full...

Date...

Address..

....

To be sent to Geo. W. Kennedy, Secretary of the Committee on Membership Am. Ph. Assoc., Pottsville, Penn.

ROLL OF MEMBERS

HONORARY MEMBERS

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.
Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.
Michael Carteighe, F. I. C., *London*, 1882.
Thomas Greenish, F. C. S., *London*, 1882.
Joseph Ince, F. L. S., *London*, 1882.
Richard Reynolds, F. C. S., *Leeds*, 1882.
Wm. Martindale, F. L. S., F. C. S., *London*, 1898.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.

GERMANY.

Dr. Edward Schaer, *Strassburg*, 1877.
Dr. Carl Schacht, *Berlin*, 1882.
Dr. Frederick Hoffmann, *Berlin*, 1898.

RUSSIA.

Dr. J. von Martenson, *St. Petersburg*, 1882.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the General Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPS. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Anniston.

Wikle, Jesse Lane 1898

Auburn.

Miller, Emerson Romeo 1895

Mobile.

Brown, Albert Edward 1887
Candidus, Philip Charles.......... 1857
La Grange, John Van Nuys 1897
Punch, William Francis. 1874
Smith, Thomas Edmond.............. 1894
Van Antwerp, Andrew 1890
Van Antwerp, Garet 1880

Montgomery.

Andrew, Edgar Cecil 1895
Brigham, Laurence Stanton 1898
Knabe, Gustavus Alexander 1876

Selma.

Galt, Edward Pegram 1883

Tuscaloosa.

Bingham, William Ellison.......... 1898

ARIZONA.

Phœnix, Maricopa Co.

Eschman, Clemens Louis 1889
Furl, Irwin William 1894
Hudson, Taliaferro Flournoy 1894

Prescott.

Brisley, Harry 1894

ARKANSAS.

Batesville.

Fletcher, John Wade............... 1894

Camden.

Morgan, Aylmer Lee................ 1890

Diamond P. O.

Laird, John....................... 1895

Forrest City.

Webb, David Crawford 1896

Fort Smith.

Morton, John Walker 1894
Sparks, James Mitchell 1894

Helena.

King, Robert Bruce 1896

Hot Springs.

Klein, Ernest Frederick 1894

Little Rock.

Bond, John Barnitz................ 1883
Dowdy, Joseph Franklin, Jr. 1894
Jungkind, John August 1887

Lonoke.

Airheart, Israel Burt 1896

Pine Bluff.

Dewoody, William Lawrence 1887

Pocahontas.

Skinner, William Henry............ 1894

Russellville.

Kerr, William Whitman 1887

Searcy.

Robertson, Felix Otey 1890

Van Buren.

Kerr, Frank Gault................. 1890

CALIFORNIA.

Benicia Barracks.

Miller, Herman 1897

Centreville, Alameda Co.

Lernhart, August 1889

Los Angeles.

Kirkland, Derwentwater 1889

Monrovia.

Marshall, Rush Porter 1893

Napa.

Levinson, Joseph 1895

Oakland.

Flint, George Benjamin 1889

Ontario.

Jesson, Jacob 1872

Oroville, Butte Co.

Ekman, Nils Adolf 1889

Pasadena.

Bley, Alphonso Albert Willets 1889

Sacramento.

Ray, Frederick Edwards 1889

San Francisco.

Argenti, Jerome John Baptiste 1893
Bayly, Charles Alfred 1889
Calvert, John 1870
Dawson, John Henry 1882
Esters von Krakau, James Henry William 1897
Grossman, Edward Lorenzo 1893
Joy, Edwin Wolcott 1882
Kelley, Charles Maurice 1897
Moffit, Thomas Sebatier 1861
Pearson, Joseph Frederick 1897
Schmidt, Valentine 1887
Searby, William Martin 1882
Stange, Carl Frederick 1897
STEELE, JAMES GURDEN 1859
Wethe, Otto Albert 1893
Wenzell, William Theodore 1870
White, Richard Edward 1889

Santa Clara.

Oberdeener, Samuel 1889

Santa Monica.

Devine, John 1887

Vallejo, Solano Co.

Topley, James 1869

COLORADO.

Boulder.

Ramaley, Francis 1897

Central City.

Best, John 1866
Davies, Llewellyn Powell 1891

Colorado Springs.

Ward, Augustus Jae 1893

Cripple Creek.

Beitenman, William Wallace 1888
Black, John Reid 1891

Denver.

De Graffe, Bertha Leon 1895
Depeyre, Louis Nolël 1894
Ford, Charles Mangan 1887
Hover, William Adgate 1895
Kochan, John 1888
Lord, Frank Jotham 1889
McCrea, Harry Francis 1895
Scholtz, Edmund Louis 1881
Steinhauer, Frederick 1881
Walbrach, Arthur 1881

Glenwood Springs, Garfield Co.

Ewing, Frederic Charles 1889

Leadville.

Taylor, George Edward 1895

Longmont.

Turrell, Judson Wade 1893

Manzanola.

Clowes, William Legh 1895

Pueblo.

Cambier, Jacob 1895
Wells, Charles Horton 1893

COLUMBIA, DISTRICT OF.

Washington.

Boyd, George Washington 1883
Bradbury, Wymond Henry 1895
Christiani, Charles 1874
Criswell, Francis McClure 1892
Douglass, Stephen William 1898

Duckett, Walter G. 1876
Easterday, Herbert Clifton 1893
Eppley, James Kerr 1895
Ewell, Ervin Edgar 1898
Field, William Carlin 1898
Flemer, Lewis 1895
Henry, Charles Landon 1893
Henry, Frank Clinton 1894
Herbst, William Parker 1895
Hilton, Samuel Louis 1890
Hurlebaus, George William 1895
Hutton, Harry Dubant 1891
Johnston, Henry Augustus 1883
Major, John Richards 1873
Martin, John Charles 1883
May, Edward 1897
Mulcahy, Daniel Domnick 1895
Schafhirt, Adolph Julian 1876
SIMMS, GILES GREEN CRAYCROFT 1860
Thompson, John 1897
Thompson, William Scott 1871

CONNECTICUT.

Ansonia.

Smith, Samuel Wheeler 1889

Bridgeport.

Fisher, Elbert Ellsworth 1892

Hartford.

Chapin, Frederick Hastings 1880
Cone, John Wright 1876
Edwards, Frederick Bulkeley 1894
Newton, Philo Woodhouse 1892
Rapelye, Charles Andrew 1876
Shannon, Thomas Ross Alvin 1892
Stoughton, Dwight George 1890
Tracy, David Wallace 1892
Williams, John Kirby 1875

Jewett City.

Chabot, David Pierre 1895

Meriden.

Mosher, William Wooster 1894

Middletown.

Pitt, John Richard 1872

Naugatuck.

May, James Oscar 1875

New Britain.

Perkins, Charles William 1892

New Haven.

Dimock, Robert Hemphill 1889
Eagny, James Thomas 1894
Gessner, Emil Adolph 1878
Hogan, John Joseph 1890
Lowe, John William 1898
Mix, Willis Lee 1896
Spalding, Warren Alphonso 1876
Sperry, Herman Jay 1880
Wood, Alonzo Felton, Jr. 1890
Wood, James Prior 1890

New London.

Cowan, John 1897
Nichols, John Cutter 1886

Noank, New London Co.

Miner, Orrin Eugene 1894

Norwich.

Duggan, James 1894
Osgood, Hugh Henry 1875
Sevin, Nathan Douglas 1875

Putnam.

Dresser, George Edward 1886

Thomaston.

Williams, Charles Fish 1888

Thompsonville, Hartford Co.

Smith, Edward Newton 1885
Steele, George Robert 1892

Waterbury.

Woodruff, Roderick Samuel 1876

Willimantic.

Wilson, Frank Milton 1883

DELAWARE.

Wilmington.

Belt, Zedekiah James 1876
Collins, Edward Smith 1897
Watson, Herbert Kennedy 1888

FLORIDA.

De Land.

Fisher, George Washington 1893

Fort George.

Rollin, John Francis 1859

Jacksonville.

Aird, William 1887

Crum, John Darius	1892
Kirk, James Edgar	1896

Key West.

DeArmona, Joseph Raymond	1893
Kolb, William Walter	1897

St. Augustine.

Smith, Lauriston Stephen	1892
Woodman, Walter Irving	1893

Tampa.

Leonardi, Sydney Beauregard	1890

Titusville, Brevard Co.

Dixon, John Marion	1894

GEORGIA.

Atlanta.

Avary, Moody Burt	1892
Cronheim, Solomon	1892
Dunwoody, Richard Gaillard	1891
Jacobs, Joseph	1894
Payne, George Frederick	1893
Sharp, Harry	1890
Watson, Sidney Powell	1887

Augusta.

Durban, Sebastian Charles	1883
LAND, ROBERT HENRY	1859
Smith, James Perrin	1894

Bowdon.

Lovvorn, James Lewis	1897

Brunswick.

Joerger, Frederick	1896

Greenville.

Tigner, James Ogletree	1890

La Grange.

Slack, Henry Richmond	1890

Macon.

Brunner, Norman Isaac	1878
Cheatham, Thomas Alexander	1890
King, Campbell Thomas	1897
Lamar, Henry James	1897
Morris, Max	1898
Taylor, Mallory Hunt	1898

Rome.

Curry, David W.	1894
Trevitt, Cleophas Aristobolus	1896

Savannah.

Offutt, Willard Chase	1896
Rowlinski, Robert Antone	1892
Solomons, Isaiah Abram	1894

Summerville.

Arrington, Homer Houston	1892

Thomasville.

Thomas, Robert, Jr	1888

IDAHO.

Emmett.

Smithson, David Elmer	1890

Mountain Home.

Davison, James	1895

ILLINOIS.

Aurora.

Staudt, Louis Carl	1890

Bradford, Stark Co.

Plummer, David Gorham	1869

Cairo.

Schuh, Paul Gustav	1894

Camp Point, Adams Co.

Bartells, George Case	1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian	1888

Chicago.

Bartlett, Nicholas Gray,	1864
Behrens, Emil Christian Louis	1893
Behrens, Paul Johannes Heinrich	1888
BIROTH, HENRY	1865
Bishop, Samuel Henry	1890
Bodemann, Wilhelm	1887
Button, Charles Edwin	1881
Conrad, John	1887
Davoll, David Lake, Jr.	1897
Day, William Baker	1895
Dorner, Emil August	1892
EBERT, ALBERT ETHELBERT	1864
Fischer, Oscar Frederick	1892
Frerkson, Richard Christopher	1888
FULLER, OLIVER FRANKLIN	1869
Gale, Edwin Oscar	1857
Gale, William Henry	1857
Grassly, Charles William	1884
Gray, William	1892

Hallberg, Carl Swante Nicanor 1879
Hartwig, Charles Ferdinand 1881
Hartwig, Otto Julius 1892
Hereth, Franklin Samuel 1893
Kirchgasser, William Charles 1888
Klein, Frederick 1893
Klotz, August Edward 1895
Lehman, Louis 1895
Lord, Thomas 1882
Lundberg, John Christian 1892
Maguire, Andrew Herman Jos. McBurney 1896
Matthews, Charles Edwards 1893
McMonies, Thomas Little 1897
Miner, Maurice Ashbel 1880
O'Gorman, Theophilus Vincent 1897
Oldberg, Oscar 1873
Parsons, John 1865
Patterson, Theodore Henry 1869
Pattison, George Henry 1893
Porter, Millett Nathan 1892
Puckner, William August 1888
Rhode, Rudolph Ernst 1887
Sargent, Ezekiel Herbert 1864
Scherer, Andrew 1884
Schmidt, Florian Charles 1882
Schmidt, Frederick Michael 1887
Scott, James McDonald 1892
Sempill, Walter Morrison 1892
Truax, Charles 1882
WHITFIELD, THOMAS 1865
WOLTERSDORF, LOUIS 1865
Wooten, Thomas Victor 1893

East St. Louis.

Knoebel, Thomas 1892

Geneseo.

Stamm, Dante Milton 1896

Highland.

Mueller, Adolphus 1871

Kankakee.

Rogers, Henry Horace 1895

Moline.

Lindvall, Charles Gustaf 1897
Sohrbeck, George Henry 1888
Sohrbeck, George William 1897

Mt. Vernon.

Morse, Edward Worth 1896

North Alton.

Barth, George Fred 1896

Pekin.

Ehrlicher, Henry Michael 1892

Peoria.

Benton, Wilber Merritt 1888
Heschong, John Frederick 1896
Lueder, Fritz 1894
Vonachen, Frank Herman 1895
Zimmermann, Albert 1893
Zimmermann, Charles 1881

Pontiac.

Murphy, John Spence 1896

Quincy.

Koch, John Adolph 1896

Streator.

Higby, William Herbert 1892

Stronghurst, Henderson Co.

Harter, Isaac Foster 1893

Vienna.

Simpson, William Calvert 1895

INDIAN TERRITORY.

Eufaula.

Moore, Charles Gates 1892

Red Fork.

Clinton, Frederick Severs 1897

Vinita.

Campbell, Marion J. 1897

Wynnewood.

Hillebert, George Allen 1894

INDIANA.

Bourbon.

Weiser, William Augustus 1894

Columbus.

Stahlhuth, Ernst Henry William 1887

Evansville.

Rogers, Edward 1897
Schlaepfer, Henry John 1879

Fairmount.

Beasley, William Alexander 1894

Garrett.

Stoehr, Julius John 1894

Indianapolis.

Carter, Frank Henry 1891
Dill, Josiah Byron 1878
Eads, Robert Isom..................1895
Eichrodt, Charles William 1892
Field, Claud 1890
Frauer, Herman Emanuel 1881
Huder, Henry J......................1894
Hurty, John Newell 1882
Lilly, Josiah Kirby..................1890
Pfafflin, Henry Adolph 1892
SLOAN, GEORGE WHITE..............1857

Jeffersonville.

Loomis, John Clarence.............1876

La Porte.

Meissner, Frederick William, Jr......1890

Muncie.

Nickey, Frank Birch 1895

New Albany.

Knoefel, Bruno 1896
Knoefel, Charles Deitrick...........1894

South Bend.

Eliel, Leo 1882
Meyer, Martin Monroe 1897

Terre Haute.

Baur, Jacob.........................1879

Union City.

Sprowl, George Melburne 1898

Warren.

Hickerson, William Henry..........1894

IOWA.

Britt.

Carton, John Arthur 1895

Charles City.

Legel, John Gotthelf 1897

Churdan.

Roberts, Thomas 1897

Clear Lake.

Etzel, John Leonhardt..............1897

Clinton.

Majer, Oscar........................1880

Davenport.

Ballard, John Winthrop 1871
Harrison, Jacob Hugh 1883

Des Moines.

Howard, Fletcher 1895
Macy, Sherman Riley 1891

Dubuque.

Torbert, Willard Horatio 1887
Wittmer, Joseph Washington, Jr.....1896

Fort Dodge.

Oleson, Olaf Martin.................1877

Fort Madison.

Schafer, George Henry 1871

Garner.

Collins, Carrie Smith 1895

Iowa City.

Boerner, Emil Louis 1877

Keokuk.

Kiedaisch, John Frederick, Jr........1893

Mason City.

Burns, Edwin Miller 1897

Muscatine.

Braunwarth, Alice Louisa 1892

Oskaloosa.

Pickett, John Harvey 1887

Sioux City.

Arnold, Charles Frederick 1891
Moore, Silas Harwood...............1880
Scherling, Gustav...................1884

Stuart.

Treat, Joseph Augustus.............1885

Waterloo.

Wangler, Conrad David 1876

Wellsburg.

Heddens, Claus Heising 1893

KANSAS.

Argentine.

McGeorge, William 1895

Fort Riley.

Temple, Oscar Fitzhugh 1897

Gypsum City, Saline Co.

Schmitter, Jonathan 1892

Hiawatha.

Miner, Mary Olds	1892

Hutchinson.

Ardery, Lorimer	1895

Lawrence.

Leis, George	1869
Moore, John Thomas	1888
Sayre, Lucius Elmer	1883
Woodward, Brinton Webb	1895

Leavenworth.

Mehl, Henry William	1892

Marysville.

Ault, Edward Abbott	1895

Ottawa.

Becker, Charles Louis	1892

Topeka.

Merrell, Ashbel Hill	1884
Washburn, Harry Monroe	1890

KENTUCKY.

Covington.

Belt, James Ferris	1892
Pieck, Edward Ludwig	1887
Zwick, George Albert	1874

Flemingsburg.

Reynolds, John Jefferson	1876

Frankfort.

Averill, William Henry	1874
Gayle, John William	1891

Henderson.

McFarland, Robert Mumford	1893

Louisville.

Beckman, Oscar Albert	1879
Diehl, Conrad Lewis	1863
Dilly, Oscar Charles	1888
Dimmitt, Addison	1895
Jones, Simon Newton	1870
Mueller, Otto Edward	1888
Newman, George Abner	1866
Overstreet, William Payne	1893
Peter, Minor Cary	1894
Peyton, Robert Docker	1887
PFINGST, FERDINAND JOHN	1867
Renz, Frederick Jacob	1883
Schliemann, Edward Bernard	1880
Schoettlin, Albert John	1882
Snyder, Robert Johnson	1887
Thieman, John Henry, Jr	1896
Troxler, Constantine, Jr	1896
Votteler, William	1895
Woods, Charles Henry Albert	1897

Shelbyville.

Preissler, Henry Webber	1893

Somerset.

Porter, Chilton Scott	1882

Uniontown.

Hardigg, William Leopold	1881

LOUISIANA.

Bayou Goula.

Viallon, Paul Louis	1870

Hammond.

Brewer, John Weems	1893

New Iberia.

LEE, JAMES AUGUSTIN	1856

New Orleans.

Chalin, Louis Fisk	1887
Dejan, John Baptist George	1891
Finlay, Alexander Kirkwood	1883
Godbold, Fabius Chapman	1887
Grambois, Augustin	1891
Kaczoroski, Adolph Onesime	1895
Keppler, Christian Lewis	1882
Legendre, Joseph Amilcar	1891
Levy, William Michael	1894
Lyons, Isaac Luria	1875
May, Eugene	1891
Metz, Abraham Lewis	1887
Meyer, Alfred	1896
Miller, Charles	1897
Otto, John Nicholas Washington	1891
Quayle, Thomas Andrew	1897
Taylor, Walter Thomas	1891
Wunderlich, Edward	1891

Plaquemine.

Hiriart, Sebastian	1891

Port Allen.

Charroppin, Emile Lafond	1891

MAINE.

Auburn.

Burrill, John Walter	1896
Robinson, William Allen	1892

Augusta.

Partridge, Charles Kimball	1867
Partridge, Frank Reuben	1895

Bangor.

HARLOW, NOAH SPARHAWK	1859
Sweet, Caldwell	1881

Bath.

Anderson, Samuel	1876

Belfast.

Moody, Richard Henry	1876

Biddeford.

Boynton, Herschel	1875

Lewiston.

Lowell, Edward Mark	1896
Moulton, Daniel Pierce	1891

Machias.

Crane, Frank Trussel	1894

Pittsfield.

Libby, Henry Fitzgerald	1882

Portland.

Broe, James Augustine	1898
Cogan, Denis Stephen	1896
Drew, Walter Israel	1896
Earl, Noble Clarkson	1894
Frye, George Carlton	1879
Goold, Joseph Edwin	1896
Hay, Edward Allston	1889
Heseltine, Daniel Wilber	1896
McClearn, Henry Trefethen	1896
Perkins, Benjamin Abbott	1878
Schlotterbeck, Augustus George	1896

Saco.

Sawyer, Charles Henry	1896

Sanford.

Wingate, Frank Holman	1896

South Windham.

Rand, Daniel Moulton	1892

Waterville.

Dorr, George Watson	1896

Woodfords.

Parks, John Kimball	1896

MARYLAND.

Baltimore.

Base, Daniel	1898
Brack, Charles Emil	1876
Brickman, Arthur Otto	1898
Burrough, Horace	1883
Caspari, Chas., Jr.	1883
Caspari, William, Jr.	1898
Corning, Albion James	1898
Culbreth, David Marvel Reynolds	1883
Davis, John Alexander	1894
Dohme, Alfred Robert Louis	1891
Dohme, Charles Emile	1863
DOHME, LOUIS	1859
ELLIOTT, HENRY ALEXANDER	1859
Emich, Columbus Valentine	1863
Foster, James Webb	1894
Fouch, William M	1898
Frames, John Fuller	1890
Gilpin, Henry Brooke	1889
Gosman, Adam John	1870
Hall, Robert Edmund Lee	1898
Hancock, John Francis	1863
Hancock, John Henry	1870
Hynson, Henry Parr	1890
Jenkins, William Edgar	1898
Kammer, Daniel Alexander	1898
Kelly, John Ignatius	1898
Lindeman, Harry Frederick	1898
Maisch, Henry	1898
Mansfield, Samuel	1898
Muth, George Lewis	1894
Muth, John Clement	1898
Muth, John Sebastian	1898
Nattans, Arthur	1883
Nordmann, Herman	1895
Pennock, Edward	1898
Pilson, Abram Owen	1898
Quandt, Arthur Albert	1894
Quandt, Ernest Edmund	1894
Richardson, Thomas Leonard	1895
Robinson, Samuel Le Roy	1898
Russell, Eugene James	1856
Schrader, August Christian	1898
Schulze, Louis	1892
Sharp, Alpheus Phineas	1855
Simon, William	1885
Smith, Theodric	1890
Stuart, William Alexander	1898

Thomas, John Benjamin	1898
Thompson, Albert Eccleston	1898
Vellines, Davies	1895
Ware, Charles Howard	1898
Westcott, James Walling	1890
Wiesel, John Martin	1898
Williamson, Robert Edward Lee	1898
Winkelmann, Henry Christian	1898
WINKELMANN, JOHN HENRY	1864

Cambridge.

DeReeves, A. Eugene	1898

Cumberland.

Hermann, John George	1878
Shryer, Thomas Wilson	1875

Frederick City.

Schley, Steiner	1878

Hagerstown.

Aughinbaugh, David Culbertson	1898
Mumma, Daniel Edgar	1897
Walts, Charles Conley	1898
WINTER, JONAS	1863

Snow Hill.

Powell, William Cottingham	1895

Taneytown.

McKinney, Robert Sentman	1898

MASSACHUSETTS.

Athol.

Burton, William Arthur	1896

Boston.

Baird, Julian William	1894
Bassett, Charles Harrison	1867
Boyden, Edward Cleveland	1874
Breck, Frederick Walter	1897
Burnham, Alfred Augustus, Jr	1891
CANNING, HENRY	1865
Capper, William Ernest	1892
Chapin, William Arms	1880
Colton, James Byers	1865
COOMBS, CHARLES EVERETT	1897
Cramer, Max	1881
Doliber, Thomas	1859
DRURY, LINUS DANA	1871
Durkee, William Carley	1885
Ewing, Mary Steele	1898
French, John Innes	1894
Gammon, Irving Parker	1891
Godding, John Granville	1875
Gorman, John Thomas Bernard	1892
Graham, Clarence Montrose	1897
Hayes, James Henry	1892
Hedley, Thomas Albert	1893
Jones, James Taber	1875
Kelley, Edward Samuel	1871
Lauricella, Felice	1896
Lewis, Ernest Grant	1892
Lowd, John Colby	1871
Markoe, George Berger	1897
Morse, Edwin Timothy	1897
Patton, Ichabod Bartlett	1858
Pierce, William Herbert	1879
Prescott, Horace Augustus	1875
Sawyer, William Frederick	1885
Scoville, Wilbur Lincoln	1891
Sharples, Stephen Paschell	1875
SHEPPARD, SAMUEL AIRUS DARLINGTON	1865
Siegemund, Charles Augustus	1882
Smith, Linville Holton	1892
Stowell, Daniel	1875
Tilden, Amos Kendall	1892
Tucker, Greenleaf Robinson	1890
Vargas-Heredia, Jorge	1891
Varney, Edward Francis	1892
Wells, Edwin Herbert	1893
West, Charles Alfred	1892
Wheeler, William Dexter	1892
Williams, George Gorham	1888
WILSON, BENJAMIN OSGOOD	1895
Wood, Edward Stickney	1879

Brockton.

Randall, Frank Otis	1893

Cambridge.

Claflin, Walter Addison	1896
Phillips, Carrie Elizabeth	1894

Cambridgeport.

BAYLEY, AUGUSTUS RAMSEY	1859
La Pierre, Elie Henry	1892
Laing, Alfred Allan	1888
Norton, George Edward	1895
ORNE, JOEL STONE	1859
Porter, Louis Fowler	1892

Charlestown.

Marshall, Ernest Clifton	1875
STACEY, BENJAMIN FRANKLIN	1860

Chelsea.

BUCK, JOHN	1855

Buck, John Lynian	1883
Graham, Joseph Henry	1897
Concord.	
Richardson, Horatio Stillman	1892
East Weymouth.	
Hoyt, George Melvin	1875
Fall River.	
Riddell, Benjamin Franklin	1892
Fitchburg.	
Estabrook, Henry Arthur	1886
Holyoke.	
Ball, Charles Ely	1885
Jamaica Plain.	
Ernst, Frank Frederick	1891
Lawrence.	
Glover, William Henry	1891
Lee.	
Pease, Francis Merrick	1880
Lowell.	
Bailey, Frederick	1869
Butler, Freeman Hall	1874
Hood, Charles Ira	1871
Robinson, Edward Augustus	1888
Thomasson, Anders	1892
Marlborough.	
Hartshorn, Frederick Arthur	1880
Melrose.	
Larrabee, John	1897
New Bedford.	
Blake, James Edwin	1866
Bunker, Elihu	1885
Shurtleff, Israel Hammond	1875
Newburyport.	
Davis, Charles Leland	1897
Goodwin, William W.	1853
Newton.	
Crowdle, John Edward	1894
Hudson, Arthur	1882
North Andover Depot.	
WHITNEY, HENRY MARTIN	1859
Pittsfield.	
Hydren, Carl	1892
Manning, John Henry	1889
Plymouth.	
Carver, Frank Hahnemann	1891
Raynham.	
Crossman, George Alvin	1872
Rockland.	
Estes, Joseph Joslyn	1870
Rockport.	
Blatchford, Eben	1857
Salem.	
Nichols, Thomas Boyden	1876
Price, Charles Henry	1882
Price, Joseph	1888
Shelburne Falls.	
Baker, Edwin	1875
South Hadley Falls.	
Benhard, Albert Henry	1894
Stoneham.	
Drake, Frederick Townsley	1894
Patch, Edgar Leonard	1872
Ward, Charles Abraham	1891
Waltham.	
Lynch, Frank Kernan	1897
Worcester.	
Guerin, James Francis	1898
Harris, Francis Mason	1894
Scott, George Theodore	1883
MICHIGAN.	
Ann Arbor.	
Eberbach, Ottmar	1869
Mann, Albert	1889
Prescott, Albert Benjamin	1871
Schlotterbeck, Julius Otto	1888
Stevens, Alonzo Burdette	1885
Armada, Macombe Co.	
Phillips, Edwin Freeman	1888
Corunna.	
Reidy, Michael	1894
Detroit.	
Helfman, Joseph	1894
Knox, James Wesley Thompson	1898
Lyons, Albert Byron	1885
Maguire, Eduord Sylvester	1897
Mason, Harry Beckwith	1896

Perry, Frederick William Riley 1885
Sherrard, Charles Cornell 1893
Stearns, Frederick 1897
Stearns, Henry Albyn 1888
Vernor, James 1866
Warren, William Matthew 1889

Flushing.

Sprague, Wesson Gage 1895

Greenville.

Hall, William Alanson 1888

Ionia.

Gundrum, George 1882

Kalamazoo.

McDonald, George 1871
Osseward, Cornelius 1897
Todd, Albert May 1885

St. Clair City.

Ward, George James 1893

MINNESOTA.

Alexandria.

Holverson, Henry Theophilus 1895
Spaulding, George Sumner 1897

Duluth.

Boyce, Samuel F. 1871
Sweeney, Robert Ormsby 1866

Faribault.

Hawley, William Bentley 1895

Granite Falls.

Johnson, Knute Alfred 1897

Grove City.

Gayner, John Niles 1890

Heron Lake.

Kellam, Charles Roderick Judson 1895

Jackson.

Portmann, Cæsar Augustus 1897

Jasper.

Johnson, Louise Loretto (Mrs.) 1898

Lake Park.

Heyerdahl, Carl Otto 1893

Minneapolis.

Allen, E. Floyd 1885
Danek, John Francis 1895
Donaldson, Joseph Coddington 1893
Gamble, Stewart 1897
Harrah, John William 1895
Huhn, Charles Hugo 1897
Huhn, George 1884
King, George Alexander Newton 1892
Lariviere, Telesphore 1896
Peterson, Johannes Otto 1895
Rauch, Henry 1897
Sanderson, Stephen Francis 1880
Shumpik, Edward 1895
Thompson, Albert Delano 1895
Wanous, Josephine Anna 1897
Webster, Hendrick Gordon 1895
Wittich, Matthew Henry 1897
Wulling, Frederick John 1893

Monticello.

Lynch, Robert Fulton 1897

New Ulm.

Eckstein, Andrew Joseph 1895

Ortonville.

Nielson, John 1897

Owatonna.

Gausewitz, William John Frederick .. 1895

Pelican Rapids, Otter Tail Co.

Axness, Ole Mikkelson 1895

Spring Valley.

Rohde, Claus Frederick 1885

Stillwater.

Richard, Alexander 1896

St. Paul.

Collier, William Kelly 1897
Faber, Frederick William 1895
Frost, William Arthur 1892
Getty, Wilmot Stevenson 1896
Heller, Charles Tomkins 1895
Warren, Edwin Alonzo 1887
Zimmermann, Bernard 1895

Warren.

Whitney, Edgar Francis 1897

Wells.

Stiles, Justin Edson 1895

Wilmar.

Carlson, Swan B. 1897
Elfstrum, Axel Fridolf 1897

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William 1883

Holmesville.

Girling, Robert Nash 1891

Meridian.

Moore, Joshua Forrest 1891

Port Gibson.

Shreve, John Alexander 1880

MISSOURI.

Aux Vasse.

Craighead, Gordon Garriet........... 1895

Boonville.

Mittelbach, William................ 1891
Wooldridge, Daniel Turley.......... 1890

Carrollton.

Petit, Henry McEwen............. 1860

Excello, Macon Co.

Powell, William David 1898

Freeman.

Dolan, Frank Linley 1888

Jefferson City.

Brandenberger, Adolph 1894

Kansas City.

Crampton, Ferd Leslie.............. 1896
Eyssell, George.................... 1889
Hess, Paul Ludwig 1892
Krueger, Owen William 1897
Lahme, Charles Adolph 1881
Walker, David 1894

Kirkwood.

Hemm, Louis Phillips 1894

Lebanon.

Farrar, Samuel Richard 1891

Louisiana.

Sombart, John Edward 1881

Mexico, Audrain Co.

Llewellyn, John Frederick 1867

Old Orchard, St. Louis Co.

Mueller, Ambrose 1894

Rich Hill.

Youngs, William 1883

St. Joseph.

Clark, James Ryland 1895
Demond, Otto John.................. 1892

St. Louis.

Allen, John Hays................... 1898
Blank, Alois 1881
Boehm, Solomon..................... 1871
Good, James Michener 1871
Grandjean, Eugene.................. 1871
Hassebrock, Henry Fred............. 1884
Hemm, Francis 1881
Hinrichs, Gustavus Detlef.......... 1895
Kaenter, Frederick William 1897
Klie, George Henry Charles......... 1878
Layton, Thomas 1892
Leitch, Arthur 1860
Mallinckrodt, Edward 1869
May, Charles Charlotte 1898
Meyer, Christian Fried. Gottlieb. 1860
Morley, William Jarman 1876
Noll, Martin James................. 1898
Pauley, Frank Charles.............. 1879
Sander, Enno 1858
Scheffer, Henry William............ 1863
Schurk, Louis...................... 1890
Schweikhardt, Richard 1890
Sennewald, Ferdinand William 1865
Uhlich, Ferdinand Gottlieb......... 1881
Vitt, Rudolph Simon 1895
Vordick, August Henry.............. 1874
Walerius, Mathias 1897
Wall, Otto Augustus................ 1884
Westmann, Frank Henry 1882
Whelpley, Henry Milton............. 1887
Whitcomb, Frederick Ezekiel........ 1888
Wilson, Charles Frederick 1891
Wurmb, Theodore Henry 1890
Young, Hiram W..................... 1894

West Plains.

Curry. Alfred Mustoon.............. 1897

MONTANA.

Helena.

Starz, Emil Alfred 1895

NEBRASKA.

Fairbury.

Pease, Autumn Vine 1893

Fort Niobrara.

Denning, Michael 1897

Fremont.

Brunner, Charles Henry 1895

Grand Island, Hall Co.

Buchheit, Augustus William 1893

Omaha.

Kuhn, Norman Archibald 1878
Mares, Ferdinand Louis 1897
Myers, Preston B 1897
Schmidt, Joseph H.................. 1897
Sherman, Charles Rollin 1889

NEVADA.

Reno.

Hodgkinson, Samuel Jackson........ 1895
Pinniger, William.................. 1895

Virginia City.

Cole, Allen M. 1895

Winnemucca.

Brown, William Ambrose........... 1893

NEW HAMPSHIRE.

Derry Depot.

Bell, Samuel Howard 1890

Dover.

TUFTS, CHARLES AUGUSTUS.......... 1856

Groveton.

Wilson, John March................ 1897

Lebanon.

Wilder, George Patterson.......... 1892

Littleton.

Kenney, Herbert Eastman 1890
Robins, Wilbur Fiske 1892

Manchester.

Baril, Joseph Benjamin 1892

Nashua.

Whitman, Nelson Samuel 1875

New Market.

Dearborn, George Luther 1853

Portsmouth.

Grace, William Day................ 1896
Green, Benjamin 1888
Preston, Andrew Peabody........... 1881

Somersworth.

Hurd, John Charles................ 1892
MOORE, GEORGE.................... 1859

NEW JERSEY.

Atlantic City.

Townsend, James Vaughan.......... 1896
Wescott, William Carter 1896

Bayonne.

Alpers, William H................. 1898

Beverly.

Dougherty, Samuel Edward 1875

Bloomfield.

Scherff, John Philip 1877

Bordentown.

Carslake, George Middleton......... 1880

Bridgeton.

Dare, Charles Ford................ 1889

Camden.

Beringer, George Mahlon........... 1893

East Orange.

Davis, William Mortimer 1879
Williams, Seward Whiting 1887

Elizabeth.

Frohwein, Richard................. 1867
Kent, Henry Avery, Jr.............. 1880
Oliver, William Murray............. 1875

Englewood.

Rockefeller, Lucius 1880

Freehold.

Walker, John Putnam.............. 1881

Hoboken.

KLUSSMANN, HERMANN 1876
Lampa, Robert Raymond........... 1892

Jersey City.

Abernethy, Maxwell 1865
Beardmore, William Arthur.......... 1890
Foulke, James..................... 1881
Gallagher, John Charles 1893
Hartnett, Eugene.................. 1893

Lohmann, Herman Joseph	1896
Lyons, Fred. Wyckoff	1893
Vockroth, Emil	1893
White, George Henderson	1868

Keyport.

Warn, William Edgar	1886

Lakewood, Ocean Co.

Harrison, William John	1896

Madison.

Brown, William Thompson	1894

Matawan, Monmouth Co.

Slater, Frank Hovey	1882

Medford.

Thorn, Henry Prickett	1879

Morristown.

Carroll, Eugene Ayers	1875

Mt. Holly.

Schetky, Lawrence Oliphant	1898

Newark.

Betzler, Jacob	1880
HOLZHAUER, CHARLES	1873
Joyce, Robert	1895
Menk, Charles William	1898
Mennen, Gerhard	1888
Sayre, William Henry	1877
Smith, Charles Bradley	1868
Smith, Clarence Pennington	1890
Staebler, Richard Elimar Johannes	1892
Staehle, Louis Lorenz	1898
Stamford, William Harrison	1876
Van Winkle, Abraham	1871
Wuensch, Charles	1898

New Brunswick.

Kilmer, Frederick Barnett	1886

Paterson.

Leonhard, Rudolph Ernest	1891

Perth Amboy.

Parisen, George Warren	1892

Plainfield.

Ollif, James Henry	1867
Reynolds, Howard Prescott	1875
Shaw, Robert Johnson	1875

Princeton.

Priest, Carlton Rodgers.	1896

Riverside.

Pine, Warren Carleton	1897

Rutherford.

Cameron, Donald Lochiel	1897

Somerville.

Cook, Gilbert Snowden	1886

South Amboy.

JACQUES, GEORGE WASHINGTON	1869
Parisen, Allen Conrey	1895

NEW MEXICO.

Hillsborough.

Nowers, Lawrence Edward	1892

NEW YORK.

Albany.

Bradley, Frank Henry	1896
Bradley, Theodore James	1896
Gaus, Charles Henry	1879
Huested, Alfred Birch	1879
Lewi, Theodor Jay	1896
Michaelis, Gustavus	1882
Richardson, Frank	1896
Turner, George Heather	1880
Walker, William John	1880

Binghamton.

Otis, Clark Zelotes	1886

Brooklyn.

Bartley, Elias Hudson	1893
Brooks, George Washington	1879
Brundage, Albert Harrison	1892
Colen, James Austin	1892
Cutts, Foxwell Curtiss, Jr.	1875
DeForest, William Pendleton	1879
Dennin, Charles	1875
Dennin, Edwin Clinton	1892
Dewender, William Henry	1896
Douglass, Henry	1875
DuPuy, Eugene	1852
Dunn, John Augustus	1867
Eccles, Robert Gibson	1885
FOUGERA, EDMUND CHARLES HENRY	1890
Haviland, Henry	1857
Henry, Hubert	1897
Klock, George Hiram	1897

Krieger, Philip	1876
Levy, Adolph	1877
McElhenie, Thomas Diamond	1872
McMahon, Joseph	1897
Newman, George Anthony	1865
OWENS, RICHARD JOHN	1860
Ray, Peter William	1892
Rosenzweig, Benjamin	1898
Snyder, Ambrose Chancellor	1867
Squibb, Edward Hamilton	1882
SQUIBB, EDWARD ROBINSON	1858
Webber, Joseph LeRoy	1886
Werner, Rudolph Carl	1892
Zellhoefer, George	1876

Buffalo.

Gregory, Willis George	1886
Hayes, Horace Phillips	1880
Lockie, James Alexander	1896
Peabody, William Huntington	1857
Rano, Charles Orlando	1866

Catskill.

Du Bois, William Laneman	1880

Corning.

Cole, Victor Le Roy	1890

Croton-on-Hudson.

Henry, Charles (Dworniczak)	1881

Dunkirk.

Davis, Eugene Miller	1892

Elmira.

HOLMES, CLAY WOOD	1873

Fillmore, Alleghany Co.

Ridgway, Lemuel Augustus	1882

Fishkill-on-Hudson.

Moith, Augustus Theodore	1860

Flushing.

Hepburn, John	1873
James, William Tefft	1882

Geneseo, Livingston Co.

Rogers, Arthur Henry	1882

Gloversville, Fulton Co.

Miller, Jason Albert	1879

Groton.

Rhodes, Charles Orman	1895

Jamaica, Queens Co.

Baylis, Lewis Fosdick	1880
Goodale, Harvey Galusha	1879
Peck, George Lyman	1883

Jamestown.

Winnberg, John Magnus	1892

Middletown.

KING, JAMES THEODORE	1859
Rogers, William Henry	1869

Mount Vernon.

Blackmore, Henry Spencer	1896
Gill, George	1872

Newburgh.

Chapman, Isaac Close	1887

Newport.

Parks, William Nathaniel	1897

New Rochelle.

Thomason, Richard John	1897

New York City.

Allison, William Outis	1895
Alpers, William Charles	1890
Amend, Bernard Gottwald	1892
Amend, Otto Paul	1892
Balser, Gustavus	1875
Billings, Henry Merry	1869
Boeddiker, Otto	1895
Chandler, Charles Frederic	1867
Coblentz, Virgil	1882
Cook, Thomas Penrose	1877
Diekman, George Charles	1898
Erb, Charles Stephan	1898
Ewing, John	1893
Fairchild, Benjamin Thomas	1875
Fairchild, Samuel William	1887
Fink, Frederick William	1886
Fraser, Horatio Nelson	1888
Freid, Isadore	1897
Gane, Eustace Harold	1895
Gardner, Robert Winslow	1867
Geisler, Joseph Frank	1889
Gregorius, George Gustavus Chas. Wm.	1898
Hauenstein, William	1883
Haynes, David Oliphant	1887
Heydenreich, Emile	1867
Hopkins, Jesse L.	1898
Hudnut, Alexander	1857
Jelliffe, Smith Ely	1895
Jungmann, Julius	1879
Kalish, Julius	1875

Keenan, Thomas John	1894
Kemp, Edward	1888
Kennedy, Ezra Joseph	1887
Kent, Robert Restieaux	1855
Kneuper, George	1897
Kneuper, George Martin	1897
Lehn, Louis	1874
Louis, Leopold George	1897
Lovis, Henry Christian	1892
Main, Thomas Francis	1872
Massey, William Morton	1885
Mayo, Caswell Armstrong	1893
McIntyre, Byron Floyd	1876
McIntyre, Ewen	1873
McKesson, George Clinton	1888
McKesson, John, Jr.	1867
MILHAU, EDWARD LEON	1858
Molwitz, Ernest	1867
Murray, Benjamin Lindley	1896
Myers, William Henry	1897
O'Neil, Henry Maurice	1879
Osmun, Charles Alvin	1868
Peters, John Miller	1896
Plaut, Albert	1894
Pleasants, Charles Henry	1890
Quackinbush, Benjamin Franklin	1886
RAMSPERGER, GUSTAVUS	1860
Reynolds, Charles Edward	1897
Rice, Charles	1870
Runyon, Edward Wheelock	1875
Rusby, Henry Hurd	1890
Sayre, Edward Augustus	1877
Schieffelin, William Jay	1892
Schimpf, Henry William	1894
Schmid, Henry	1887
Schmidt, Ferdinand Traugott	1886
SEABURY, GEORGE JOHN	1876
Sieker, Ferdinand August	1893
Skelly, James Joseph	1866
Smith, Reuben Randolph	1890
Stewart, Francis Edward	1884
Takamine, Jokichi	1898
Tsheppe, Adolph	1876
Wichelns, Frederick	1881
Wickham, William Hull	1870
Wilson, William	1876

Oswego.

Butler, Charles Henry	1887

Plattsburgh.

Hitchcock, John E.	1892

Port Henry.

Smith, Edward Salvister	1890

Richfield Springs.

Smith, Williard Alfred	1880

Saratoga Springs.

Fish, Charles Frederick	1866
Pennington, Thomas Henry Sands	1877

Syracuse.

Burdick, Frederick Richard	1897
Dawson, Edward Seymour, Jr	1876
Snow, Charles Wesley	1876

Utica.

Blaikie, William	1879
Maine, August	1892

Wellsville, Alleghany Co.

Hall, Edwin Bradford	1879

Willard.

Rich, Willis Simmons	1882

Yonkers.

Eschman, Frederick William Rudolph	1880
Petsche, Franz Fred.Bismark Wilhelm	1892

NORTH CAROLINA.

Asheville.

Smith, Whitefoord Gamewell	1892

Charlotte.

Wearn, William Henry	1888

Concord.

Johnson, Daniel Dudley	1894

Durham, Orange Co.

Vaughan, Parry Wyche	1882
Yearby, William Morgan	1894

Mt. Airy.

Banner, John	1898

Oxford.

Hancock, Franklin Willis	1888

Raleigh.

Birdsong, Edwin Grey	1898
Bobbitt, James Henry	1894
Hicks, Henry Thomas	1898
McRae, John Young	1894
Simpson, William	1873

Tarboro.

Macnair, Whitmel Horne 1898
Zoeller, Edward Victor 1878

Wilmington.

Hardin, John Haywood............1881

NORTH DAKOTA.

Cavalier.

Ulm, Albert Gustave...............1897

Fargo.

Christianson, Lars 1896
Day, George Alvah 1896

Grafton.

Haussamen, Henry Louis 1888

Jamestown.

White, Herbert Eugene 1897

Lakota.

St. John, Sydney Sylvester...........1897

Valley City.

Lee, Charles John 1896
Sullivan, John Wilber 1897

OHIO.

Caldwell.

Bowron, Walter Henry 1890

Cambridge.

Ogier, John Morrison 1895

Chillicothe.

Howson, Arthur Bayshawe 1886
Nipgen, John Alvin 1879

Cincinnati.

Betz, Otto Edward........... 1887
DeLang, Alfred 1887
Eger, George......................1864
Fennel, Charles Theodore Piderit 1886
Fieber, Gustavus Adolphus..........1893
Freericks, Frank Herman...........1897
Gordon, William John Maclester ...1854
Greve, Theodore Lund August.......1864
Greyer, Julius 1880
Heinemann, Otto..................1864
Hoffman, Julius 1887
Klayer, Louis 1884
Koehnken, Herman Henry..........1875
Lloyd, John Uri 1870
Meininger, Albert.................1881
Merrell, Charles George.............1888
Merrell, George 1879
Phillips, Charles Wilson 1881
Ruppert, John.....................1880
Sauer, Louis Wendlin 1882
Schroeder, John Henry.............1896
Serodina, Herman 1880
Simonson, William 1887
Vilter, Hermann Theodore 1881
Wagner, Henry 1876
Weeks, Benjamin Franklin..........1891
Wetterstroem, Albert Frederick Charles.1888
Wetterstroem, Theodore David 1897
YORKSTON, MATTHEW MACKAY 1864
Zuenkeler, John Ferdinand 1887

Cleveland.

Acker, Philip 1889
Arny, Harry Vin 1891
Asplin, John Harding 1882
Bechberger, Henry 1893
Benfield, Charles William...........1893
Bruce, James 1882
Cobb, Ralph Lathrop 1883
Feil, Joseph.......................1885
Foster, Charles Ebenezer............1898
Gleim, John Christopher............1893
Haake, William Henry 1893
Hannan, Owen Burdette............1893
Hechler, George Louis........... ..1882
Hopp, Lewis Christopher 1876
Kieffer, George....................1890
Kuder, William Frank..............1893
Lane, Edward Baxter...............1893
Lehr, Philip 1885
Myers, Daniel.....................1882
Richardson, Samuel William 1897
Schellentrager, Ernst August 1882
Schoenhut, Christian Henry 1888
Selzer, Eugene Reinhold............1893
Sherwood, Henry Jackson 1894
Sords, Thomas Vincent 1893
Stecher, Henry William 1895
Urban, Jacob Philip 1881
Voss, George William 1885

Columbiana.

Ink, Charles Elliott.................1885

Columbus.

Bruck, Philip Henry................1884
Byrne, John 1894
Hatton, Edgar Melville.............1878

Hatton, Ellmore Wright............1894
Huston, Charles..................1872
Kauffman, George Beecher..........1882
Rauschkolb, John 1894
Schueller, Ernst 1881
Schueller, Frederick William........1880

Columbus Barracks.

Griffith, Thomas..................1897

Conneaut, Ashtabula Co.

Symonds, Arthur Henry 1892

Dayton.

Burkhardt, Mark Anthony 1887

Delaware.

Pfiffner, Fritz John R...............1894

Findlay.

Firmin, John Curtis................1893

Glendale, Hamilton Co.

Feemster, Joseph Hall..............1873

Grand Rapids, Wood Co.

Thurston, Azor....................1886

Jefferson, Ashtabula Co.

Case, Charles Henry 1892

Lancaster.

Adamick, Gustave Hattenhauer......1891

Logan.

Harrington, Frank 1869

Massillon, Stark Co.

Kirchhofer, Peter Paul 1881

Middletown.

Johnson, Charles Brayton 1876

Navarre.

Grossklaus, John Ferdinand......1859

New Philadelphia.

Miller, William Harvey.............1898

Scio.

Beal, James Hartley 1892

Springfield.

Casper, Thomas Jefferson...........1867
Lisle, Justin Dickson 1894
Siegenthaler, Harvey Newton 1882

Wooster.

Ohliger, Lewis Philip 1871

OREGON.

Ashland.

Sherwin, Eugene Alonzo............1889

Portland.

Blumauer, Louis 1889
Pfunder, William..................1889

The Dalles.

Blakeley, George Clarence 1892

Woods, Tillamook Co.

Linton, Charles Elsworth 1896

PENNSYLVANIA.

Allegheny City.

Eggers, Frederick Hermann 1872

Beaver, Beaver Co.

Andriessen, Hugo 1875

Carlisle.

Horn, Wilbur Fisk 1876

Chambersburg.

Keefer, Charles DeWalt 1891

Connellsville.

Berryhill, Henry Pennick 1890

Du Bois.

Hay, Charles La Mar 1898

Harrisburg.

George, Charles Theodore 1873
Gorgas, George Albert..............1884
Gross, Edward Ziegler..............1883
Miller, Jacob Augustus 1873
Smith, Benjamin Franklin 1892

Haverford.

Harbaugh, Wilson Linn............1896

Honesdale.

Leine, Arthur Moritz 1895

Lancaster.

Heinitsh, Charles Augustus......1857
Heinitsh, Sigmund William 1889

League Island.

Walts, David Yarnall...............1897

Lebanon.

Lemberger, Joseph Lyon..........1858
Redsecker, Jacob Henry............1881

Lock Haven.

Prieson, Adolph 1880

Mercer.

Graham, Frank Reed 1897

Norristown.

Reed, Willoughby Henry 1893
Stahler, William 1880

North Wales.

Childs, William Rhoads 1896

Philadelphia.

BAUER, LOUIS GUSTAVUS 1867
Bohn, Charles Henry 1897
Borell, Henry Augustus 1874
BORING, EDWIN MCCURDY 1867
Bullock, Charles 1857
Burg, John Dellinger 1888
Cliffe, William Lincoln 1898
Cuthbert, Richard William 1893
Danner, William Edward 1896
Dobbins, Edwards Tompkins 1867
Eddy, Henry Clay 1869
Ellis, Evan Tyson 1857
England, Joseph Winters 1893
Feidt, George David 1898
Fox, Peter Paul 1869
French, Harry Banks 1890
Gano, William Hubbell 1892
Gerhard, Samuel 1873
Grahame, Israel Janney 1856
Guise, P. Nettleton 1897
HANCE, EDWARD HANCE 1857
Hassinger, Samuel Ellphat Reed 1880
Haussmann, Frederick William 1895
Heintzelman, Joseph Augustus 1858
Hoch, Aquila 1896
Jenks, William Jenks 1858
Jones, Alexander Henry 1874
Kebler, Lyman Frederic 1894
Keeney, Caleb Reynolds 1868
Kline, Mahlon Norwood 1878
Koch, Louis 1872
Kraemer, Henry 1892
Krewson, William Egbert 1875
LaWall, Charles Herbert 1896
Lowe, Clement Belton 1895
Matusow, Harry 1897
McIntyre, William 1868
Mellor, Alfred 1864
MILLER, ADOLPH WILLIAM 1868
Milligan, Decatur 1867
Moerk, Frank Xavier 1898
MOORE, JOACHIM BONAPARTE 1860
Morison, John Louis Dales 1895
Morris, Lemuel Iorwerth 1880
Mulford, Henry Kendall 1896
Ottinger, James Jeremiah 1876
Peacock, Josiah Comegys 1892
Pearman, William Edgar 1898
Perot, Thomas Morris 1857
Pile, Gustavus 1881
Potts, David Gardiner 1893
Preston, David 1868
Procter, Wallace 1874
REMINGTON, JOSEPH PRICE 1867
Rittenhouse, Henry Norman 1857
Ryan, Frank Gibbs 1892
Sadtler, Samuel Philip 1893
Shafer, Erwin Clement 1893
Shimer, Miles Herman 1897
SHINN, JAMES THORNTON 1860
Shoemaker, Richard Martin 1869
Stedem, Frederick William Edward 1892
Thompson, William Beatty 1858
Warner, William Richard 1857
Webb, William Henry 1867
Weidemann, Charles Alexander 1868
Wendell, Henry Edward 1873
Wiegand, Thomas Snowden 1857

Pittsburgh.

Emanuel, Louis 1878
Hays, Joseph Anthony 1892
Henderson, Archibald Keys 1888
Kelly, George Armstrong 1882
Koch, Julius Arnold 1892

Pottsville.

Diebert, Thomas Irvin 1882
Kennedy, George Washington 1869

Reading.

Weida, Charles Arthur 1896
Ziegler, Philip Milton 1867

Shamokin.

Smink, Robert William 1893
Smink, William Henry R 1885

Towanda.

Porter, Henry Carroll 1880

Warren.

Dixson, Frederick Hartly 1892

West Chester.

Evans, Joseph Spragg	1877

White Haven.

Driggs, Charles M	1881

Williamsport.

Cornell, Edward Augustus	1873
Duble, Jesse Balderston	1870

York.

Patton, John Franklin	1880

RHODE ISLAND.

Narragansett Pier.

Tobin, John Martin	1887

Newport.

Baker, Maury Davison	1897
Cotton, William Henry	1885
Downing, Benjamin Franklin, Jr	1886
Huntington, William Hunter	1891
Roberts, William	1897
Wood, John William	1897

Providence.

Blanding, William Oliver	1894
CALDER, ALBERT LAYTON	1859
Danforth, Edmund Culver	1878
Fenner, Alexander Wilson, Jr	1888
Gilbert, Charles Atwood	1891
Greene, William Ray	1883
Hardy, Cyrus Daniel	1891
O'Hare, James	1888
Pearce, Howard Anthony	1894
Potter, William Robert	1894
Reynolds, William Keys	1876
Wood, Mason Bowen	1882

Westerly.

Collins, Albert Burlingame	1882

Woonsocket.

Simmons, Frank Birtles	1897

SOUTH CAROLINA.

Anderson.

Wilhite, Frank Turner	1893

Charleston.

Aimar, Charles Pons	1879
Plenge, Henry Charles	1894

Columbia.

Thomas, Oscar Ernest	1882

Greenville.

Carpenter, Alfred Baxter	1898

Newberry.

Robertson, Peter	1896

SOUTH DAKOTA.

Dell Rapids.

Bent, Edward Clarence	1897

Sioux Falls.

Dunning, Lyman Tylor	1897

Watertown.

Jones, David Franklin	1895

Yankton.

Brecht, Frederick Adolph	1895

TENNESSEE.

Chattanooga.

Greve, Charles Mathias	1887
Voigt, Joseph Frederick	1893

Clarksville.

Lockert, Charles Lacy	1894

Columbia.

Rains, Aris Brown	1894

Harriman.

Kline, Charles Grant	1894

Knoxville.

Rosenthal, David Abraham	1894

Memphis.

Peck, Frank Hugh	1897
ROBINSON, JAMES SCOTT	1869
Treherne, John Curtis	1894

Nashville.

Blackman, William Marshall	1896
Bloomstein, Max	1896
Burge, James Oscar	1878
Davis, Edward Benjamin	1896
Ruddiman, Edsel Alexander	1894
Thomas, James	1896

TEXAS.

Dallas.

De Lorenzi, Albert	1890
Eberle, Eugene Gustavus	1896

El Paso.

Irvin, William Armstrong............1879

Galveston.

Cline, Raoul Réné Danniel..........1898
Orton, Ingomar Francois...........1891

Houston.

Burgheim, Jacob..................1892

Paris.

Greiner, William Edward...........1892

San Antonio.

Dreiss, James Edward..............1898
Pfeiffer, John....................1898
Schmitt, George Joseph Francis......1890

Sherman.

Sheehey, Henry Lee...............1898

Taylor.

Thames, Joseph Jefferson...........1895

Van Alstyne.

Neathery, James Miller.............1892

UTAH.

Salt Lake City.

Druehl, Frank August...............1889
Hill, Frederick John...............1895

VERMONT.

Brattleboro.

Root, Wilfred Franklin..............1898

Fort Ethan Allen.

Cabell, Henry Otto.................1897

Rutland.

Higgins, Albert Warren.............1895

St. Albans.

Dutcher, Alfred Luther.............1892

St. Johnsbury.

Bingham, Charles Calvin............1875

VIRGINIA.

Charlottesville.

Maphis, Charles Gilmore............1898

Danville.

Cole, Howson White................1882
Goldsborough, Charles Henry.......1898

Falls Church.

Church, Merton Elbridge...........1892

Fredericksburg.

Hall, Horace Byrd.................1896

Leesburg.

Purcell, Nicholas Sidney............1890

Newport News.

Burgess, William Gaither...........1898

Norfolk.

McLarty, Colin.................1898

Richmond.

Baker, Thomas Roberts............1856
Briggs, Andrew Gessner............1890
Harrison, Richard Heth Munford....1895
Miller, Turner Ashby...............1894
Scott, William Henry..............1873
Slaughter, Philip Mercer...........1897

South Boston.

Faulkner, Garland Estes............1898

Suffolk.

Hargrave, Edward Thomas..........1897

WASHINGTON.

Fort Walla Walla.

Krick, Charles Augustus............1898

La Connor, Skagit Co.

Joergensen, Gerhard Johan Carl Sophus.1889

Pullman.

Watt, George Henry....... 1896

Seattle.

Holmes, Henry Elliott.............1880

Snohomish.

Wilbur, Lot......................1896

Tacoma.

Cummings, Henry Thornton........1853
Stewart, Andrew Morley.............1896

Walla Walla.

Mason, George L..................1895

WEST VIRGINIA.

Wheeling.

Williams, William Hudson..........1880

WISCONSIN.

La Crosse.

Beyschlag, Charles.................1880

Madison.

Kremers, Edward	1887

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius	1884

Medford.

Hammel, Joseph	1897

Milwaukee.

Conrath, Adam	1881
Dadd, Robert Morrow	1896
DRAKE, JOHN RANSOM	1860
Frank, Hermann Otto	1898
Kettler, Edward, Jr.	1896
Kienth, Hans	1884
Ruenzel, Henry Gottlieb	1892
Schrank, Charles Henry	1876

Neillsville.

Sniteman, Charles Clarence	1881

WYOMING.

Rawlins.

Stuver, Emanuel	1895

DOMINION OF CANADA.

MANITOBA.

Winnepeg.

Flexon, Charles	1897

NEW BRUNSWICK.

St. John.

Coupe, Robert Edward	1894

NOVA SCOTIA.

Halifax.

Simson, Francis Cook	1876
Simson, William Amore	1894

ONTARIO.

Hamilton.

Clark, John Alexander	1890

Ottawa.

SAUNDERS, WILLIAM	1860
Watters, Henry	1896

St. Thomas.

Foster, William Orrville	1881

Stratford.

WAUGH, GEORGE JAMES	1862

Toronto.

Heebner, Charles Frederick	1894
Holgate, Francis Heasell	1895
Lander, John Cambridge	1877
Robinson, Ernest Frankish	1889

Windsor.

D'Avignon, John Eugene	1888

Woodstock.

Karn, William Alfred	1898

PRINCE EDWARD ISLAND.

Charlottetown.

Dodd, Simon Walker	1884

QUEBEC.

Iachine.

Ranson, Edward Alphonse	1897

Montreal.

Baridon. Louis Richard	1890
Chapman, William Henry	1895
Gray, Henry Robert	1867
Howey, John Joseph	1896
Lachance, Seraphin	1888
Lanctot, Henri Raymond	1894
Lecours, Joseph Edourd Wilfrid	1896
Macmillan, Alexander Morrison	1896
Miles, Henry	1896
Morrison, Joseph Edward	1888
Muir, Ebenezer	1895
Reed, Thomas Dennis	1896
Tremble, John Edward	1896

Quebec.

Dubé, J. Edmond	1897
Power, John J.	1897
Roy, Joseph Auguste Emile	1896
Willis, Henry	1897

Three Rivers.

Williams, Richard Wellington	1883

MEMBERS RESIDING IN FOREIGN COUNTRIES (*except Canada*).

Bowen, William Africanus, Delagoa Bay, Portuguese East Africa	1897
Hammar, Alrik, Yokohama, Japan	1897
Heyl, James Bell, Hamilton, Bermuda	1863
Martin, Nicholas Henry, Newcastle upon Tyne, England	1891
Power, Frederick Belding, London, England	1872
Rumsey, Samuel Louis, Honolulu, Hawaiian Islands	1876
St. Cyr, Etienne Laurent Nelvil, Aux Cayes, Hayti, W. I.	1897
Wellcome, Henry Solomon, London, England	1875

MEMBERS WHOSE RESIDENCE IS UNKNOWN.

Leitch, Arthur	1860
McConville, Thomas Aloysius	1864
McPherson, George	1865
Wardell, Robert C.	1860

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Westmoreland & 15th sts., Philadelphia, Pa.
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22 E. High st., Springfield, O.
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182 Main st., Woonsocket, R. I.
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Simonson, William,
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Simpson, William,
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Simpson, William C.,
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Simson, Francis C.,
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Simson, William A.,
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Smith, Edward S,
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182 Main st., Ansonia, New Haven Co., Conn.
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252 Beauregard st., Mobile, Ala.
Smith, Whitefoord G.,
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LIST OF MEMBERS WHO HAVE RESIGNED SINCE PUBLICATION OF LAST REPORT.

	Elected.		Elected.
Braun, Adolf	1894	Mebane, Robt. S	1894
Brown, Robert A	1896	Mohr, Charles	1871
*Colburn, Jesse M	1895	Murray, Emmett L	1894
Decary, Louis A	1895	Noer, Olaf	1897
Downing, Lucien B	1892	Perkins, Wm. A	1869
Finley, Arthur C	1890	Plummer, Edward	1889
Flanagan, Lewis C	1875	Ruete, Theodore W	1870
Geiger, Charles F	1894	Scheffer, Emil	1872
Griffen, Truman	1895	Schmitt. Joseph M	1882
Hawkins, M. Smith	1870	Smith, Linton	1870
Helke, William L	1889	Stratte, Halvor A	1897
Hobbs, Wm.	1892	Thomsen, John J	1883
Holland, Sam'l S	1876	Trautmann, Ludwig	1893
Karb, George J	1883	Van Auken, Jerrie A	1880
Kyseth, Bernt O	1897	Wienges, Conrad	1875
Leist, Jacob L	1881	Wyckoff, Elmer E	1894
Mason, Harry R	1894	Zimmer, Harry E	1892

* Resigned in 1897.

LIST OF MEMBERS WHO HAVE DIED SINCE PUBLICATION OF LAST REPORT.

Alexander, Maurice W.,	St. Louis, Mo,	Elected	1871
Berrian, George W.,	North Andover, Mass.,	"	1857
Dragendorff, George (Honorary),	Rostock, Germany	"	1868
DeVrij, Johann E. "	The Hague, Netherlands,	"	1871
Ingalls, John,	Macon, Ga.,	"	1876
Lilly, Eli,	Indianapolis, Ind.,	"	1878
ROSENGARTEN, M. G.,	Philadelphia, Pa.,	"	1869
Sellers, Walter S.,	Chambersburg, Pa.,	"	1897
Stam, Colin F.,	Chestertown, Md.,	"	1882
Taylor, Alfred B.,	Philadelphia, Pa.,	"	1852
Trimble Henry,	"	"	1876
Tuma, Bruno,	New Orleans, La.,	"	1891
White, Aaron S.	Mt. Holly, N. J.,	"	1860
Wilson, John E.,	Walnut Ridge, Ark.	"	1896

LIST OF MEMBERS DROPPED FROM THE ROLLS FOR NON-PAYMENT OF DUES, ACCORDING TO ARTICLE III., CHAPTER VII., OF THE BY-LAWS.

(PUBLISHED IN ACCORDANCE WITH A GENERAL RULE ADOPTED AT MONTREAL, CANADA, AUGUST, 1896. SEE PAGE 17, VOLUME 44, PROCEEDINGS.)

	Elected.
Adams, John D	1892
Anderson, James M	1893
Armstrong, Geo. R	1877
Ayer, Chas. F.	1891
Baltzley, Zachariah T	1876
Binkley, George K	1892
Bradley, Augustus	1894
Breunert, Herman O.	1895
Bronson, George S	1893
Brother, William	1892
Caldwell, James W	1875
Capdau, Pierre A.	1895
Carr, Jerome C.	1895
Cates, Wm. E.	1888
Cornell, Russell W	1893
Cotton, Robert M	1893
Cox, William A.	1894
Crady, Edward E	1892
Crawford, Walter B., Jr	1891
Crolius, Frank M	1884
Crona, Sixtus E. S.	1885
Croom, James D	1890
Danz, Martin	1895
Darrah, Andrew J	1895
Daus, Leopold L	1895
Davis, Samuel C	1893
Davis, Theodore G	1890
Dent, Warren F	1895
Doerschuk, Albert N	1895
Dorr, Edward C	1895
Egeling, B. F. Gustavus	1893
Elliott, Arthur H	1892
Entz, Jacob J	1895
Fleischer, Adolph T	1888
Flett, Frederick W	1895
Fortier, Lawrence H	1892
Freeman, William B	1894
Gee, Charlie	1893
Gegelein, Frederick L	1881
Gooding, Charles J	1892
Goodrich, George H	1895
Hall, Alden T.	1895
Hall, Nettie C	1893
Hamlin, James A	1895
Harding, Lawrence A	1892
Hervey, James	1892
Hettinger, Howard H	1894
Hogey, Julius H.	1880
Holland, George	1894
Hubert, Ernest	1891
Huecker, John	1891
Humiston, Edwin R., Jr.	1895
Hunter, Henry B	1894
Jewell, Walter H	1895
Jones, Edward B	1894
Kaiser, William O	1893
Keene, Thomas R	1888
Keith, Irwin A	1892
Kenworthy, John	1895
Kershaw, John P	1895
Lawbaugh, Emanuel S	1895
Lee, Charles H	1891
Lowden, John	1875
MacDonald, Allan D	1895
McColgan, Adam T	1892
McMeel, James H	1895
Miller, James M	1889
Miller, Polk	1894
Miville, Francis C.	1877
Morgan, Eugene H.	1892
Mork, Thomas K	1895
Naly, Sarah L	1895
Neppach, Stephen A	1889
Newbold, Thomas M	1876
Nisbet, William W	1883
Noll, Matthias	1891
Owens, James A.	1882
Parcher, George A.	1875
Parker, Arthur S	1891
Parker, William S.	1895
Parkill, Stanley E	1887
Porterfield, William C.	1895
Qvale, Victor A	1889
Richter, Gustave A.	1890
Rogers, Wiley	1874
Rosewater, Nathan	1880
Roux, Nemours P.	1895
Schmidt, Carl	1891

	Elected.
Schrouder, Benjamin	1895
Scott, Alexander W	1893
Shelton, William A.	1891
Smith, Frank T	1894
Snyder, Alva L	1873
Stark, Harry H	1893
Steinmetz, Frank J	1895
Tammen, George	1895
Thatcher, Hervey D	1865
Tomfohrde, Chas. W.	1890
Tomlinson, Burton A	1895
Valliant, George E	1891
Vance, James W	1895
Vickers, Rufus W	1894
Ward, Charles E.	1895
Ward, Milo W	1895
Westlake, Leonard J	1895
Wetherell, Albert S	1892
Weyer, John	1887
Whiting, J. Fred	1895
Wills, Fred. M.	1890
Woods, George D.	1895
Woolley, Stephen D	1888
Zahn, Emil A	1881

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Yu-tung, 871

Z.

Zamia integrifolia, 878
Zinc, in drinking water, 943
  phenylhydrazine acetate, 1079